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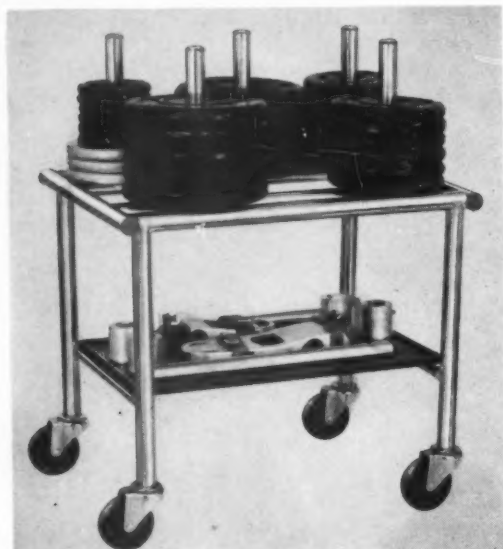


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THE JOURNAL OF THE ASSOCIATION FOR PHYSICAL AND MENTAL REHABILITATION

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STANDING BARS

ROY H. NYQUIST, M. D.*
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 JAMES P. SHERIDAN, B. S.†
 ERNEST BORS, M. D.††

Introduction

The purpose of this article is to review the events which have occurred at this Spinal Cord Injury Treatment Center from 1946 to 1960, and to show the development from the original modified Stokes litter basket to the latest simple and even portable devices which substitute for the muscles of the lower extremities for therapeutic standing bars.

Review of our Devices

From 1946 to 1950 upright posture in patients with spinal cord injury was achieved at this Center with long leg braces, the majority of which had no pelvic bands. Only braces in use for patients with levels from T-10 to T-4 were so equipped. Patients with cervical spinal cord injury were helped to stand upright either with the aid of long leg braces with pelvic bands in a walker, or in some

instances with a modified Stokes litter which was hoisted with a rope and pulley. The Stokes litter was fitted with a pair of wheels on the foot end (Fig. 1).

In 1951 the modified Stokes litter arrangement was supplemented by the tilt-table (1) (Fig. 2). This apparatus provided a better positioning, more ease in placing the patient, and improved support for the legs, abdomen, and arms. The device proved to be a time saving method for the gradual elevation from the supine to the standing position.

In 1952 a standing work bench was made providing a method by which a paraplegic patient could stand at his work without applying braces (Fig. 3). In 1953 we placed patients upright in a walker without lower extremity braces simply by placing straps in position to keep the knees and hips extended. In a few patients with strong hip flexor spasticity it was necessary to add axillary support and a strap or pad in front of the chest (Fig. 4).

The principle of knee and hip extension with strap support was also utilized at the entrances to the parallel bars (Fig. 5). It became very popular with the patients between 1953 and 1957 because

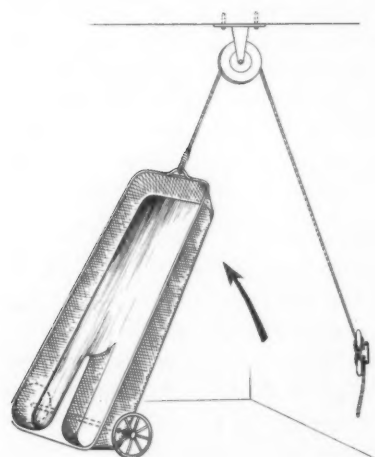


FIG. 1
 Modified Stokes Litter Basket
 Fitted With Wheels at Foot
 End and Hoisted by Means of
 Rope and Pulley



FIG. 2
 1960 Type of Construction of
 Tilt-Table

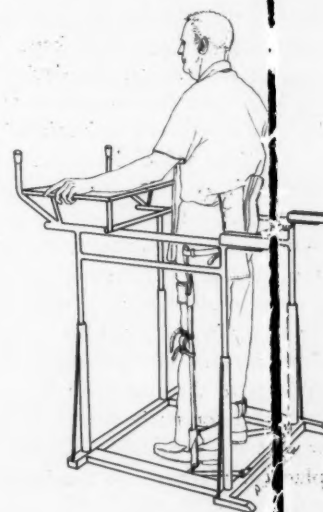


FIG. 3
 Standing Work Bench



FIG. 4

Illustrates Method of Strap Supports on Walker for Knees, Buttocks, Chest, and Axillary Crutch Supports, for Standing Without Leg Braces

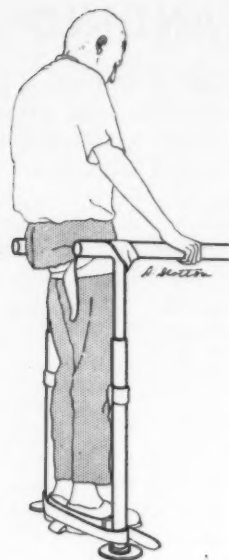


FIG. 5

Illustrates Strap Supports at End of Parallel Bars. The Heel Strap is Only Needed When the Hamstrings are Spastic

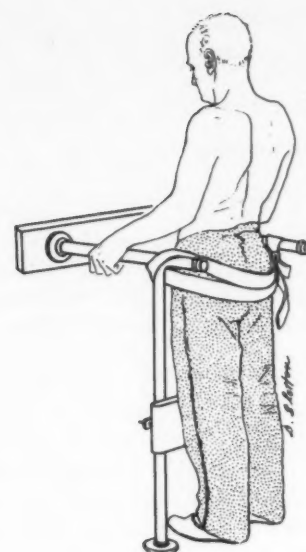


FIG. 6

Illustrates Non-Portable Standing Bar Fastened to Wall. Note Padded Adjustable Knee Board

it eliminated the use of braces. This led eventually to such congestion at these entrances that they were blocked off for the patients who wanted to use the parallel bars for brace ambulation. In order to correct this situation it became necessary to design a type of non-portable standing bar fastened to the wall which would not take up excessive space and would yet achieve the desired objective (Fig. 6). In place of straps which kept the knees extended, a well-padded board was devised which was adjustable in height to fit both short and tall patients. Straps were still used to maintain hip extension.

These principles have been further developed and utilized for our new portable standing bar (Fig. 7). Strap support for the knees with a sheepskin sleeve is adjustable in height. Airplane buckles are used on the web straps which are two inches wide and six feet in length. The heel strap is only necessary in patients with spasticity in the hamstrings. For patients 66" in height, the top bars should be 36" above the platform; for patients 69" in height, 38"; and for patients 72" in height, 40". The entire weight is 35 pounds, allowing easy movement from place to place about the home.

Comments

The importance of weight bearing in the upright position for the patient with a spinal cord injury has become well recognized. Its physiologic

effect is manifold (2) and can be shortly described as follows:

Weight bearing places that adequate stress on the long bones of the lower extremities which stimulates the proper deposition of calcium in the bones (3) and reduces calciuria resulting from osteoporosis; the latter predisposes to fracture with minimal trauma (4) as demonstrated by the incidence of about 7 percent of fractures observed at this Center.

The upright position enhances drainage of urine from the kidneys to the bladder (5) and this prevents pooling in the renal pelvis and calyces; since pooling of urine, plus increased calciuria are important factors for the incidence of urinary calculosis (6) the upright position plays a major part in the reduction of renal stones.

The establishment of bladder function is of great importance for the patient with spinal cord injury. The achievement of this task is assisted by the upright position in that it increases the intravesical pressure (7) which in turn presents the stimulus for eliciting the contraction of the detrusor muscles.

Numerous devices have been published to put a patient with a spinal cord injury in the upright standing position (8, 9, 10, 11, 12, 13). None of them is as simple as the portable standing bar arrangement presented here. It is easily constructed, easily moved about, and requires a minimum of space in

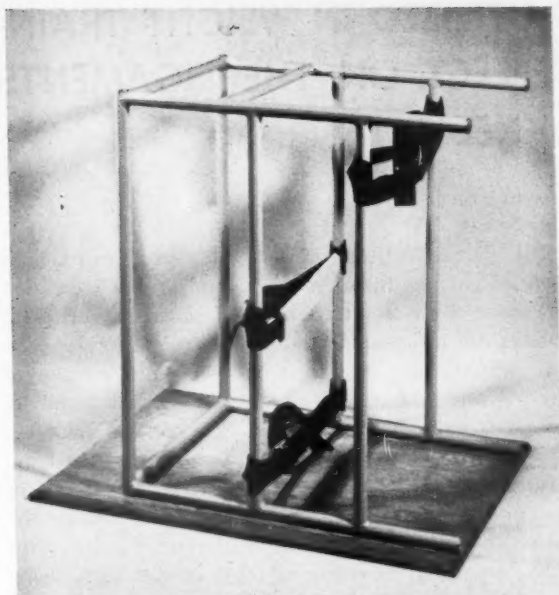


FIG. 7

Dr. Nyquist Portable Standing Bar is Fastened Securely to Plywood Base Which is Only 28" Wide Allowing Easy Movement Through 30" Doorways

the patient's home. The portable standing bar, furthermore, allows an easy conversion into a work bench by simply affixing a board across the parallel bars in front of the patient. Some of the useful purposes served by the portable standing bar, in addition to therapeutic standing, are as a work bench for such activities as drafting, blueprint reading, light mechanical bench-work, painting, leatherwork, hobbies, studying, preaching, teaching, reading, writing, typewriting and telephoning.

Summary

The development of standing devices used at this Center from 1946 to 1960 for patients with spinal cord injury has been reviewed. Two new types, one fixed and another portable, have been presented.

The importance of the upright position for the reduction of osteoporosis and urinary calculosis, and for the development of bladder function has been briefly discussed.

Acknowledgement

We wish to express our thanks for the illustrations to our Medical Illustrations Department.

REFERENCES

1. Willhite, Charles S., J. C. Russey, and E. Bors, The Quadriplegic Standing Frame. *Archives Physical Medicine and Rehabilitation*, 8:236-239, April 1954.
2. Bors, E., Spinal Cord Injuries. *Technical Bulletin* 10-503, *Veterans Administration*, Washington, D. C., December 15, 1948.
3. Abramson, A. S. and A. Ebel, Rehabilitation in the Management of Prolonged Illness. *Med. Clin. North American*, 37:915-932, May 1953.

4. Hall, R. H., Fracture Healing in Paraplegics in *Proceedings, Second Annual Clinical Paraplegia Conference*, Veterans Administration, 52-54, 1953.
5. Bors, E., Intravenous Ausscheidungs Urographie by gleichzeitiger Beruck Sichtung verschiedener Nierenhaltungen. *Zschr f. Urol.*, 25:893-912, 1931.
6. Comarr, A. Estin, A Long Term Survey of the Incidence of Renal Calculosis in Paraplegia. *J. Urol.*, 74:447-452, Oct. 1955.
7. Gould, D. W., A. C. L. Hsieh, and L. F. Tinckler, The Effect of Posture on Bladder Pressure. *J. Physiol.*, 129: 448-453, 1955.
8. Newman, Louis B. and Elizabeth L. Jameson, Assistive Devices for The Disabled. *Occupat. Ther. and Rehabilitation*, 30:8-13, Feb. 1951.
9. Climo, Samuel, The Erect Position as an Aid in the Care of the Paraplegic: A Useful Mechanical Aid. *Plastic and Reconstructive Surgery*, 13:65-69, Jan. 1954.
10. Climo, Samuel, Use of Tilt Table in Early Rehabilitation of Paraplegic Patients. *J.A.M.A.*, 154:1000, March 10, 1954.
11. Machek, Otakar and Frances Cohen, A New Standing Table. *Am. J. Occupational Therapy*, 9:158-160, July-August 1955.
12. Boyd, Mary Lou and Jack Mohoney, A Standing Frame with Adjustable Lap Board. *Phys. Ther. Rev.*, 39:32, Jan. 1959.
13. Nyquist, Roy H., Functions of a Physical Medicine Section for a Paraplegic Service in *Proceedings, Second International Congress of Physical Medicine*, 386-394, Kobenhaven, 1956.

COMBINATION THERAPY AIDS BONE CANCER VICTIMS

Encouraging results from a new form of treatment of bone cancer have been reported by a group from the Hines, Ill., Veterans Administration Hospital. The group includes Ervin Kaplan, M.D., I. Gordon Fels, Ph.D., John J. Ignarizio, M.D., Bruno R. Kotlowski medical technician, Joseph Greco, B.S., and William S. Walsh, M.D., from the hospital's radioisotope and surgical services.

Eight patients with carcinoma of the prostate which had spread widely to bone received intravenous injections of radioactive polymetaphosphate (a condensed form of phosphate labeled with the P32 radioisotope of phosphorus). Seven of the eight showed relief of pain and clinical improvement. Eleven others who had the same sort of cancer received the polymetaphosphate plus treatment with the hormone estrogen. The doctors said the combination of estrogen and polymetaphosphate therapy apparently produced results better than those from use of either agent alone.

Many of the eleven patients receiving the combination therapy have shown rapid, complete disappearance of bone pain, weight gain, and minimal undesirable effects from the radiation.

Improvement of the bone lesions was noted from x-ray films. Several of the patients who had been bedfast became able to walk for the first time in several months.

Some of the group had very widespread involvement of the bones of the pelvis and spine. Of the two who had paraplegia of recent onset, one had a complete remission of the paraplegia and the other showed marked improvement.

Despite the observation that several patients have remained well for more than a year, it is emphasized that the treatment is thought to be palliative only since the cancer has, in some cases, become active again after a number of months.

Phosphate labeled with P32 has been in use for some years in treatment of malignant tumors spreading to bone. However, the radioactive polymetaphosphate seems to localize better in the growing bone around the cancerous areas than does the labeled phosphate. Thus, the new treatment apparently surrounds the bone cancer with a shell of radioactivity and tends to spare healthy tissue from radiation damage.

The Hines VA doctors indicated further followup of the combination estrogen-metaphosphate therapy will be made, and they strongly suggested that metaphosphate be tried for other sorts of bone cancer.

THE DEEP SQUAT EXERCISE AS UTILIZED IN WEIGHT TRAINING FOR ATHLETICS AND ITS EFFECT ON THE LIGAMENTS OF THE KNEE

KARL K. KLEIN, FACSM, FAPMR*

There seems to be a little doubt as to the effectiveness of the modern concepts of weight training for increasing athletic efficiency. Both empirical practices and research have done much to expand this phase of training technique from both the standpoint of increased efficiency in action as well as the prevention of injury through the building of muscular strength and mass that are effective against the contact forces received in various sports. In all of this advancement there has been one basic factor overlooked from the standpoint of anatomical structure and relationship of the muscles to the ligaments as it applies to the knee joint area and that is the effect of the deep squat exercise on both the muscles as well as the ligaments. A review of the existing anatomical and medical literature as well as anatomical dissection studies and a ligament stability study of competitive lifters *v.s.* a large group of students participating in physical education, who have not done any deep squat exercises, have been completed and comparative results strongly indicate that the following information should be made available to all concerned with this problem of specific weight training exercise.

For those interested in a further review of the medical literature related to this problem three references are recommended (1, 2, 3). By this review one will become appreciative of the research that has been accomplished in the Physical Education Rehabilitation Laboratory at the University of Texas and is described in this paper.

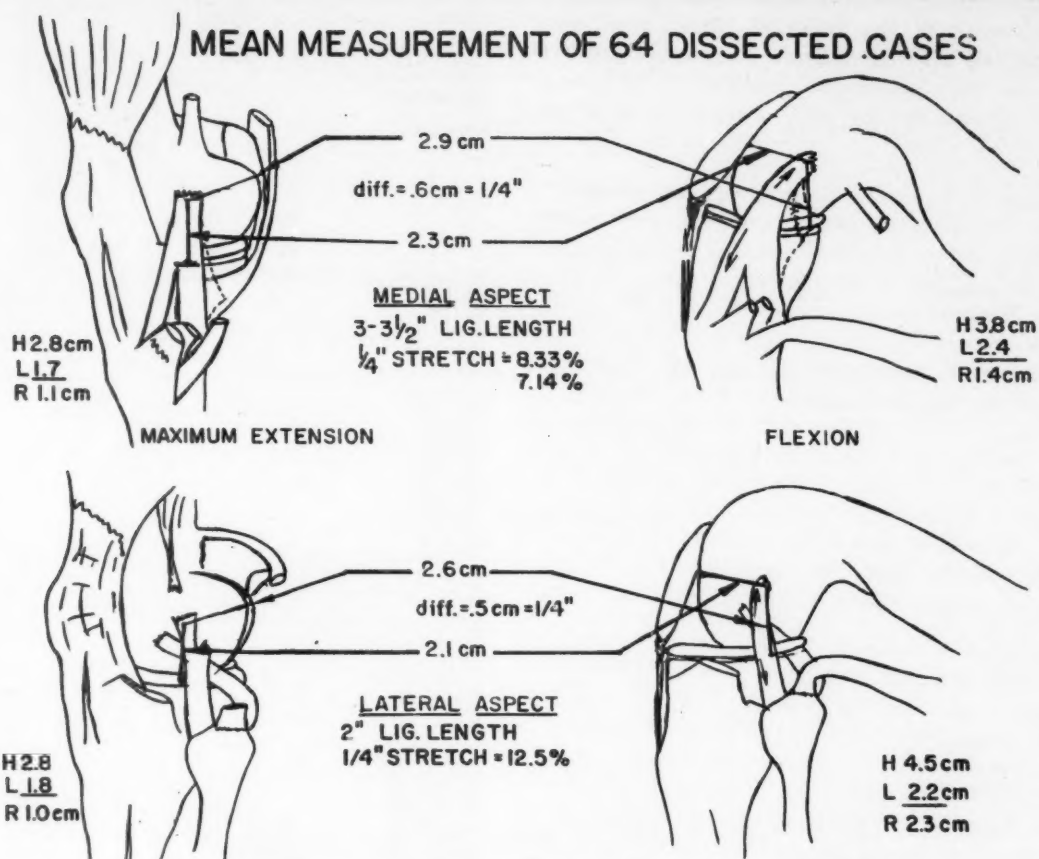
In order to facilitate the understanding of the problem as to how the ligaments function in flexion and extension of the knee the kinesiology of fundamental action will be presented. In the normal flexion of the knee, *in non-weight bearing*, the tibia rotates inward and in extension the tibia rotates outward in its normal positional relationship with the femur. In the flexion process the medial collateral ligament drifts posteriorly with the anterior fibers becoming tighter just before full flexion is reached, and the posterior fibers have a tendency to become relaxed.

But, in this drifting process the medial cartilage is pulled further back into the joint, and it is pressed between the tibia and femur. In full extension these fibers are in a state of maximal tension and as soon as flexion starts the ligament goes into a state of relaxation. This is due to the fact that the condyles of the femur are so shaped that relaxation takes place but as the full flexion state is approached the anterior fibers again become tight, and tighter than in full extension, because the posterior part of the condyles begin to slide into position on the tibia with the origin and insertion of the anterior fibers being stretched further apart than in the normal standing position. In full knee extension the lateral collateral ligament is in a state of maximal tension. As flexion starts the ligament then goes into a state of relaxation as the tibia starts to rotate inward. As full flexion is approached the greatest tension is exerted on the ligament due to the increase of the origin and insertion distance.

The cruciate ligaments have a mixed action in full extension of the knee, one being tight and one being relaxed, but as the knee goes into flexion these ligaments so wrap around each other that an additional tension is placed on them as full flexion is approached.

This total normal relationship is changed *when the foot is in contact with the ground* and the toes are slightly outward as observed when the deep squat exercise is being done. First, as the squatting action takes place the normal inward rotation of the tibia on the femur can not take place in normal movement relationship and as the squatting action progresses the movement of the femur on the tibia tends to force the tibia into abnormal external rotation. This action immediately begins to exert abnormal stress on all of the ligaments. There is a greater stress on the anterior fibers of the medial ligament, and the medial cartilage is placed under weight bearing stress as it is forced backward into the joint. Secondly, the lateral ligament is placed under abnormal stress because in the excess outward rotation of the tibia on the femur the total ligament is placed under abnormal tension beyond its normal length hence causing total stretching as the inser-

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A Comparative Study of Distance From the Mid-Point of Origin of Collateral Ligaments to Weight Bearing Surface of Femur in Standing and Squat Position of the Knee.

FIG. 1

tion moved away from the insertion. In addition, an excess amount of stress is placed upon the cruciate ligaments, and the "jacking apart" action that takes place within the joint places tension on these ligaments especially the anterior cruciate as determined from test results. Once the full squat position is reached and the standing effort is made, the medial cartilage is "shot forward" into the joint and an additional potential damage may take place by the tearing of the posterior section of this cartilage. This elementary explanation of function will have a direct bearing on the additional evidence to follow that has been accumulated from study efforts.

In dealing with the problems of ligament instability created by athletic injury we have found that approximately 35-40 percent of our knee cases, either post-operative or post-injury, have demonstrated ligament instability to the involved knee joint. The highest percentage is to the medial ligament and is basically caused as a result of the forceful

contact that disturbs the normal joint movement relationship in the forceful abnormal external rotation of the tibia on the femur as the contact is applied. The action results in ligament stretching or medial cartilage tearing or both. This ligament problem has been basically responsible for the research into the effect of the deep squat exercise and its relationship to the ligament problem.

In addition to the literature review, a series of knee dissectional studies were made on 64 cadaver cases at the University of Texas Medical School. The intent of these measurements was to find the relationship between the ligament tension in the standing position and in the deep squatting position. Measurements were from the medial and lateral epicondyle to the point of weight bearing of the femur on the tibia in the standing position as well as to the greatest posterior distance on the femur condyle that would be in contact with the tibia when the squatting position was assumed. Fig. 1 illustrates

DEEP SQUATTERS 128 CASES

	RIGHT LEG				LEFT LEG			
	Ligament Weakness				Ligament Weakness			
	Med.	Lat.	Cruciates Ant. Post.		Med.	Lat.	Cruciates Ant. Post.	
	68	91	70 0		80	95	81 0	
% Total Ligament Weakness	52.3	71.7	54.7 0		62.5	74.2	62.8 0	

49.2% Med. L&R; 69.8% Lat. L&R; 50% Ant. Cruc. L&R; 62.3% with 2 or more ligaments weak on both sides; 5.4% no ligament weakness.

NO SQUATTERS 386 CASES

	RIGHT LEG				LEFT LEG			
	Ligament Weakness				Ligament Weakness			
	Med.	Lat.	Cruciates Ant. Post.		Med.	Lat.	Cruciates Ant. Post.	
	24	16	149 0		14	23	146 0	
% Total Ligament Weakness	6.7	4.2	38.8 0		3.6	6.5	37.8 0	

1.3% Med. L&R; 1.6% Lat. L&R; 32.3 Ant. Cruc. L&R; 1.0% with 2 or more ligaments weak on both sides; 49.2% no ligament weakness.

A Study of the Effect of the Deep Squat Exercise on Ligament Instability

TABLE 1

the mean findings for this phase of the study. According to the measurement process it was determined that the medial ligament mean stretch from the standing to the squat position would be from 7+ to 8+ percent when based on the total length of the ligament according to Moseley. The lateral ligament mean stretch was 12+ percent when based on the total ligament length. According to this data it would indicate that possibly the lateral ligament would become more involved in the problem of instability than the medial ligament when the deep squat exercise was done, and it will be observed in the next phase of the study that this relationship existed when the "deep squatter" group was measured. It may also be concluded within the limits of this dissectional study that both the medial and lateral

ligaments are exposed to abnormal stretch effect in deep squat action.

The intergroup comparisons between two groups of subjects were used. Group "A" experimental was made up of 128 subjects. They were competitive lifters at the Pan-American games held in Chicago during the summer of 1959, coming from three universities in the Austin area as well as from a number of weight lifting meets held here in Texas. Only those who had practiced deep squat exercises in training and competition were included.

Group "B" control was made up of beginning weight lifting classes, basketball classes and gymnastic classes a total of 386 subjects from universities in the area. None of the group had ever done any deep squat exercises with weights and did not indicate



(top) Medial Aspect
(center) Lateral Aspect
(bottom) X-Ray Showing Deep Squat Position

FIG. 2

that they had done the activity outside of classes. All those with any record of previous knee injury were eliminated from this group.

The standard orthopedic tests were used to determine ligament status. The ligaments were either stable or unstable, and no attempt was made to measure the exact amount of instability. All tests were made by the author according to standard testing procedures. Table I is included to illustrate the ligament instability findings for the experimental and control groups. As an initial comparison it is to be noted that the evidence presented in the dissectional study which indicated that possibly the lateral ligament would be exposed to greater stretching than the medial ligament was verified in the test results for the deep squatter group. There were

19.4 percent more right lateral ligaments unstable than right medial ligaments and 12 percent more left lateral ligaments unstable than left medial ligaments. By Chi Square analysis the right side was above the 0.1 level at 9.50; the left side was above the .05 level at 4.62.

In further comparison of the deep squatter group with the control group there was 46 percent greater medial ligament instability in the right leg and 58 percent in the left leg of the deep squatter group. There was 67 percent greater lateral ligament instability in the right leg and 59 percent in the left leg of the deep squatter group. There was also 16 percent greater anterior cruciate ligament instability in the right leg and 25 percent in the left leg of the deep squatter group. Of significant note is the fact that there was 61 percent greater ligament instability in two or more ligaments of both legs of the deep squatter group. *But the control group had 44 percent more members with no demonstrated ligament instability than the deep squatter group.*

Fig. 2 is included to illustrate the anatomical effect on the medial and lateral ligaments under discussion. The X-ray phase of this figure in an attempt to illustrate the effect of the "deep squat" action on the knee. The subject was one of the deep squatters included in the study who demonstrated considerable ligament instability. The picture shows an apparent abnormal external rotation of the tibia on the femur, which would account for abnormal stress on the lateral ligament. On the medial side the wide separation of the condyle of the femur from the tibia illustrates the abnormal stress placed on the medial ligament.

In addition to the percentage comparisons on an intergroup basis a Chi Square analysis was made for the two groups of the study (Table 2).

The statistical conclusions of extremely high Chi Square analysis for each of the major items of comparison indicates that the exercise in question, the deep squat, is basically responsible for the production of the ligament instability found. Realizing that the testing procedures used in the study were subjective tests, one has to accept the fact that an experienced tester is capable of demonstrating the evidence of stability or instability of ligaments with relative ease. Also one should also discount the factor of causal relationship as a chance relationship because of the medical writings related to the problem of ligament stability and instability as based on the specific movement in question.

Group I Non-Squatters vs Group II Deep Squatters

Significant levels: .05-3.84; .01- 6.64; .001- 10.83

	Chi Square
R. medial ligament	144.0
R. lateral ligament	265.45
R. anterior cruciate	10.838
L. medial ligament	219.03
L. lateral ligament	257.10
L. anterior cruciate	26.30
medial ligament L&R	196.51
lateral ligament L&R	294.9
anterior cruciate L&R	13.59
2 or more ligaments weak both L and R.	27.2
All ligaments O.K.	73.7

TABLE 2

Experimental Conclusions

Basically the evidence accumulated in the various phases of this study strongly indicate that the deep squat exercise, especially as done in weight training, and used in athletic or other type of physical conditioning should be discouraged from the standpoint of its debilitating effect on the ligament structures of the knee.

There are many implications of the effect of the instability that can be created for both the immediate and future well being of the individual. If the ligaments are to be considered as the first line of defense against knee injury and that they work in unison with the muscular strength for stability, then the deep squat exercise as a builder of strength actually works in opposition to the general theory that has been advocated for use of the specific exercise and develops a weakened structure instead of a more stable one. As an outcome the injury potential is increased.

Of additional significance to the problem are the later implications of knee instability that are created in youth. During the post-school years when activity decreases the general muscular tone and strength will decrease. At this time the stability of the ligaments become increasingly more important because of its effect on the joint. If the ligaments have become weakened and stretched then an abnormal slippage or movement is possible within the joint area resulting in numerous orthopedic complications.

Further Exercise Implications

There are additional implications derived from this study over and above those made from the use of and effect of the exercise with weights. These implications are that other exercises used in general conditioning that are of a deep squatting nature may also be detrimental to the structure of the knee

joint in the creation of ligament instability. Activities such as deep knee bends, duck waddles, and squat jumping exercise all could eventually lead to a weakening of the ligament structures of the knee joint. It is a reasonable assumption that this could happen because the same basic anatomical action as found in the deep squatting exercise of weight training is incorporated in the movement. The stretch effect would probably not take place as rapidly because the foot is not so stable in its contact with the ground as in weight work squatting, and the excess tibial torsion on the femur is not as severe. On the basis of this evidence one might conclude that ultimate weakening of the ligaments will take place.

The author is also cognizant of the fact that there are other groups of people participating in physical activities who would seem to place these same stress factors on the knee joint. Just what the results are in relation to this ligament problem has not been determined through testing procedures. The specific groups in mind are the Cossack dancers, ballet as well as modern dancers. Basically the stress of certain movements are similar in action to that of the squat jump and deep squat action with vigor of action adding to the weight stress factor as it reacts against the internal structures and ligaments of the joint. What the end results of such activities are on knee problems in later life is not known by the author. There is one basic factor of difference between these groups and football players—in activity the football player is exposed to many lateral forces through contact that necessitate maximal ligament stability as part of the protective mechanism of motion. The other groups are not exposed to such contact forces. The ultimate conclusions in this matter will have to be drawn by the reader.

As an example of this stretch effect a further comparison of the non-squatting group was made with a group of paratroopers of one of the U.S. Military Forces. As a part of the vigorous training and conditioning program of this group the squat jump exercise is utilized. Other than the abnormal compression of the internal structures of the joint *the squat jump exercise alternately places the knee in the full squat position with the fully body weight being thrown onto the fully bent knee.* It is this effect that places alternate abnormal strain on the ligaments of the knee joint.

A total of ninety-five (95) paratroopers were tested. The same orthopedic tests were used in the measurement procedure as with the other groups of the initial study. The results are recorded in Table 3.

Group III: Para-Troopers using the Squat Jump Exercise in Training

	Right Leg				Ligament Weakness	Left Leg			
	Medial	Lateral	Cruciates			Medial	Lateral	Cruciates	
			Ant.	Post.				Ant.	Post.
	9	48	32	0		6	47	43	0
% ligament weakness	9.47	50.5	33.6	0		6.3	48.4	45.3	0

4.2% medial L. & R.; 44.2% lateral L. & R.; 31.5% ant. cruc. L. & R.; 13.9% with two or more ligaments weak on both sides; 25.2% no ligaments weak.

TABLE 3

The Chi Square formula for statistical analysis was used for inter-group comparisons with the Non-Squatter group of the major study as in Table 2. The significant levels are the same as those previously mentioned (Table 4).

Group I Non-Squatters vs Group III Para-Troopers

	Chi Square
R. lateral ligament	146.21
L. lateral ligament	119.6
Med ligament L. & R.R.	5.29 above .05 level
Lat. ligament L. & R.	159.9
2 or more ligaments weak both L. & R.	60.15

TABLE 4

There was no significant differences between the right medial ligaments and the right anterior cruciates as well as the left medial ligaments and left anterior cruciates of these two groups. Also there was no significant differences between the combined anterior cruciate tests left and right for these groups.

It is concluded that there is some factor within the training program of the paratroopers that would account for the apparent ligament instability that was demonstrated from the tests administered. This factor could well be that the alternate deep squatting effect creates abnormal compression within the joint combined with abnormal external tibia torsion on the femur placing an over-stress on the ligament structures of the knee and creating the instability that was determined by testing procedures.

Recommendations

On the basis of the evidence accumulated in these studies it is recommended that:

1. Every effort be made to discourage the use of

specific exercise that will produce factors of ligament instability within the knee joint.

2. Efforts be made to modify the specific exercises under question so that leg strengthening can result without potential damage to the ligament structures of the knee.

3. The following modifications of exercises be considered:

- a. In weight training no more than a one-half ($\frac{1}{2}$) squat be used, feet pointing straight ahead or slightly toeing inward. In the squatting position the thighs should not reach the right angle or slightly less than parallel with the floor. The feet should be flat on the floor.
- b. In the squat jump exercise, the lower leg should be far enough back so that the knee just comes in contact with the floor. In this way there is no compression in the joint and the forward leg, which is no less than a right angle of flexion, takes the stress of the activity.

In Addition

On the basis of this research data the deep squat exercise as well as the squat jump exercise for building of leg strength and ligament stability are contraindicated. This is not an entirely true assumption since muscular strength is built *but also ligament instability is created* as indicated by the study population tested. In order to build muscular strength then exercise modification is needed as previously recommended.

If it is necessary for the competitive weight lifter to do deep squats for certain lifts then he is going to have to sacrifice ligament stability for the activity.

Cont'd on P. 23

PROGRESSIVE RESISTANCE EXERCISE IN ADAPTED AND CORRECTIVE THERAPY*

DAVID H. CLARKE, Ph. D.**

There can be no doubt that the only way to increase muscular strength effectively is to exercise the muscles directly by means of some system of weight training. Corrective therapists (and of course others in the field of rehabilitation) have long been interested in this phenomenon, especially as it applies to the hastening of recovery or the attainment of specific functional skills in hospitalized patients.

Although the use of resistive exercises for therapeutic benefits extends in history from earliest man, the application of exercise to develop the body and to correct physical defects finds its origin long before formal rehabilitation was recognized, or prior to the early established beginnings of physical education. As Clarke (7) has pointed out, "records and drawings have been found showing the use of crude corrective gymnastics by the Chinese about 3000 B.C. There is evidence of the use of exercise, massage, and baths by the early Egyptians, Hindus, Greeks, and Romans." Study of the historical evolution of formal exercise is both fascinating and enlightening, and of importance to therapists and research workers interested in particular aspects of this special field.

Physiological Considerations

Equally interesting is the study of early concepts regarding the manner in which fuel and oxygen taken in by the body are converted into the energy of muscle shortening. These physiological considerations give us an understanding of the actual mechanism involved when weight X is lifted distance Y. Undoubtedly, a certain aura of mysticism has been associated with bodily functions, the mechanisms of which can not be directly observed. As far back as the Second Century, A.D., Galen felt that some manner of "animal spirits" passed from the brain via the nerves into the muscles, and caused transverse swelling and longitudinal shortening, a concept that persisted for some 1400 years (10). Since that time, scientists from many countries have contributed information leading to our present theories of energy transformation in muscle. For a more complete review of the literature of the physiology of pro-

gressive resistance exercise, two articles by Rasch (16, 17) are suggested as excellent references.

Static Exercise

Perhaps some of the most stimulating research to come to our attention in recent years is that of Dr. Erich A. Muller of the Max Plank Institut fur Arbeitsphysiologie in Dortmund, Germany. His experiments into methods of increasing muscular strength have led some newspapers in this country to suggest that "at last we have found the goose that laid the golden egg." However, there is some skepticism that all is not as simple as at first was hopefully thought by some reporters.

In one study, Muller, in collaboration with his student Hettinger (12), investigated the effect of static muscular contractions as a training method for increasing strength. They conducted 71 separate experiments on nine subjects over a period of 18 months. The exercise consisted of holding a predetermined tension against a spring scale, utilizing primarily the elbow flexor and extensor muscles. Their training sessions were conducted five days a week with Saturday an occasion for measuring maximum strength. Some of the conditions that varied were: intensity of contractions, length of time they were held, and the number of practice sessions per day. It is interesting to note that apparently muscular strength increased more rapidly when the intensity of training reached about two-thirds of maximal strength, and that a further-increase of load seemed to have no further effect. Also, results indicated that one practice period per day in which the tension was held for six seconds caused as much increase in strength as did longer periods and more frequent practices. One of the significant points made in discussion of results was the suggestion that the cause of the increase in strength was believed to be not the intensity of contraction nor degree of exhaustion of the fibers, but was dependent upon the amount of oxygen deficit. Their work also included the finding that a training load of less than one-third maximal strength produced no hypertrophy, perhaps because this was insufficient to produce an oxygen deficit. In fact, subsequent work by Hettinger (11), employing a work load of one-fifth of the maximal strength, supported these findings by producing no strength increases under these conditions.

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In order to investigate the extent that muscular contraction is effective in occluding circulation of the muscles involved in static exercise, and thereby bringing about an oxygen deficit, Royce (18) studied these factors under conditions of both normal and occluded circulation. He tested a group of subjects on a spring-loaded Smedley hand dynamometer twice, the first test consisting of a static contraction of the gripping muscles which was kept at maximum effort for a period of 90 seconds. A second test was given in the same manner, but the circulation was cut off by a pressure cuff around the upper arm inflated to 220 mm. Hg. Analysis of the resultant fatigue curves showed no difference for the two conditions until 50 seconds had elapsed, at which time the occluded curve continued its downward trend, while the non-occluded curve did so, but to a significantly lesser extent. The point at which the two divided was approximately 60 per cent of the initial strength. This gives us indirect evidence that the circulation was effectively occluded by internal muscle pressure up to this time, and also gives more exact data than the Hettinger-Muller interpretation, of the amount of tension in which the muscle pressure and the blood pressure balance each other.

Carrying these concepts one step further, it is felt by this writer that if the blood flow through the muscles is impaired during the maintenance of tension, then much of the energy cost of a contraction, if it is held for very long, would have to be paid off in the form of oxygen debt after the muscle has relaxed. In contrast, the periodic compression and relaxation of the muscle pressure against the veins during dynamic work would tend to promote local blood flow and thereby increase the oxygen transport during exercise, thus resulting in a comparatively small oxygen debt. Recent experimentation seems to bear this out (3). The oxygen consumption of 24 subjects was measured with a closed-circuit metabolism apparatus during rest, five minutes of isometric exercise, and recovery (all in the standing position). The first exercise period consisted of the subjects holding a 50-pound weight in the hands with knees partially flexed. Second and third tests were given in the same manner using 35-pound and 20-pound weights. When compared with a dynamic exercise at comparable metabolic work loads, there was a significantly smaller oxygen income during work and a larger oxygen debt, thus supporting the theory that the circulation was being occluded by the muscle tension.

It is interesting to note the development of knowledge pertaining to this type of resistance exer-

cise. However, this recent experimentation should come as no surprise, for static exercise is not new, and especially it is not unknown to therapists and rehabilitation workers who have for years understood, at least from a practical standpoint, many of these concepts. I am speaking particularly of "muscle setting" exercises which have been employed by therapists, especially when joints are immobilized or pain limits range of motion. If performed vigorously and sustained for a sufficient length of time, there can be no doubt of the efficacy of this procedure as a technique for increasing muscular strength.

Dynamic Exercise

From time to time another question has arisen when discussing the best way in which to administer progressive resistance exercises, and that is essentially this: is it best to lift the weight slowly or perform the repetitions rapidly? This is not merely a question of static exercise on the one hand versus dynamic exercise on the other; rather it concerns more exactly the methodology in dynamic exercise. Certainly, there is a place for PRE as we know it in the treatment of muscular weakness, especially when it is important to exercise a group of muscles through a wide range of motion. Inasmuch as different motor units become activated in different anatomical positions, it is readily apparent that more muscle fibers will contract if the excursion is larger. What, then, is the answer — shall we make the movements fast or slow?

Apparently, there is a paucity of information that directly bears on this problem. It sometimes appears as if we assume that the heavier the weight lifted the better is our exercise technique. However, this may not necessarily be the case at all. It may very well be that the *manner* in which the weight is lifted is far more important than how much it actually weighs.

Fortunately, there is some indirect evidence that may provide a better understanding of the process involved in progressive resistance exercise. As has been pointed out, static exercise causes an occlusion of the circulation with the resultant lack of oxygen to the tissues, a situation that leads to an imbalance of the depletion-replenishment mechanism, and brings about muscular fatigue. When fatigue curves for given amounts and duration of exercise are analyzed, rather interesting comparisons can be made.

Several experiments have been undertaken at the University of California into this phenomenon. In all cases the spring-loaded Smedley hand dynamometer was used, the subjects squeezing maximally

at all times. Fatigue curves were obtained for exercise performed under the following experimental conditions:

1. An isometric (i.e., static) contraction maintained for a period of 90 seconds (18).
2. An isotonic (i.e., dynamic) exercise consisting of the subjects contracting the forearm muscles once every four seconds for twelve minutes, and, again, once every second for six minutes (15).
3. Finally, a contraction that is sustained for four seconds, released for one second, and repeated for a total of six minutes (1).

When each of these four fatigue curves are smoothed and plotted as a function of force on the one hand and time on the other, very pronounced differences can be seen. Performing contractions once every four seconds shows very little fatigue, although, admittedly, some is present. The difference between initial and final strength is less in this situation than in the others. Exercising once every second, on the other hand, shows a very pronounced drop in strength to the steady state level, which, although much lower than in the previous conditions, is still slightly higher than the next or third series of holding the contraction for four seconds and releasing it for one. Not only the fatigue level, but the over-all shape of this latter curve more closely approximates the curve for true isometric contractions, which describes a rapid fatigue, and reaches its asymptote (or plateau) at the lowest degree of strength.

The question of interpretation of these findings becomes a little philosophical, because at best it only indirectly applies to our initial problem of methodology of exercise administration. Also, many factors are involved that cannot be resolved here. However, other things being equal, and accepting the original hypothesis that increasing muscular strength is dependent to some extent at least upon an oxygen deficit in the tissues being exercised, then it would seem from analysis of these fatigue curves that performing repetitions slowly, and even sustaining the contraction for some seconds would be highly advantageous. The alternative apparently is to go to the other extreme and perform the exercises very rapidly, as the fatigue curves in both instances approach that of the isometric contraction. The common denominator is probably the rest interval allowed between successive efforts, for the purpose of the exercise would undoubtedly be lost if recovery took place between repetitions.

It would seem of importance to further investigate various of these factors, especially from a practical standpoint, so that more direct evidence can

be brought to bear on a number of problems. We do know from the physiology of muscular activity that the contraction process is complex, and we cannot safely label any one factor as more important than another. However, it is necessary to investigate many facets of exercise in an effort to determine some of the cause and effect relationships.

Objective Determination of Resistance Load

The final phase of progressive resistance exercise that I wish to deal with is that of the determination of the maximum capacity of any muscle group, and, in particular, to determine the resistance load for the final ten repetitions. I have been interested in this aspect for several years, especially as it applies to DeLorme's procedures (8), for it has been a constant problem of therapists and technicians to determine with as little delay as possible, the amount of weight that can be lifted ten times, inasmuch as this is probably the most widely used method of exercise administration.

In 1953, Klein and Johnson (14) published a paper in which they suggested a method of determining this maximum load for development of the quadriceps muscles. They stated that their subjects could usually produce a knee-extension bout of ten repetitions maximum when the resistance load was five pounds less than the amount of weight they could lift on a single effort.

However, two years later, the writer, together with E. L. Herman (4) proposed a method quite dissimilar from that of Klein. Utilizing a cable-tensiometer to measure the maximum static strength of the quadriceps muscles, a group of subjects were given five knee extension exercise bouts based upon 30, 35, 40, 45 and 50 per cent of this amount. In each instance, the subjects were instructed to perform as many complete repetitions as possible. The results showed that a very linear pattern of repetition decrement from the light to the heavy resistance loads was present for both right and left legs, and that a value of 50 per cent of the strength of the muscles tested was found to be reasonably satisfactory for determining the ten repetitions maximum.

It should be pointed out that although a cable-tensiometer was employed, it is possible to use some other measuring device such as a strain gauge, a dynamometer, or a heavy spring scale, although objections have been raised concerning this latter instrument (6). As a matter of fact, with this linear arrangement of repetition decrement, it is quite possible to calculate the weight necessary for ten repetitions maximum merely by performing an initial bout utilizing any random weight (2).

In exercising the muscles around the knee joint, the quadriceps group probably receives most consistent emphasis, even though it has been demonstrated that hamstring weakness accompanies quadriceps deterioration following injury (13). No doubt the hamstring muscles and other knee flexors should be given equal consideration in many of our treatment procedures for knee disabilities. In an effort to expand the concept of objectively determining resistance loads for ten repetitions maximum, the author, together with R. N. Irving (5), applied a similar research design to the flexor muscles of the knee. Utilizing again a cable-tensiometer for measuring the maximum static strength of these muscles, the subjects performed as many repetitions as possible utilizing weights that were 40, 45, 50, and 55 per cent of this strength. Results indicated that employing 55 per cent of strength was quite satisfactory for obtaining the desired ten repetitions maximum. Again, there appeared to be a linear decrement of repetitions from light to heavy work loads, although the curve was much more steep than was true for the quadriceps exercise. In addition, there were more individual differences apparent at the lighter loads for knee flexion exercise. Undoubtedly, this reflects the basic differences that exist in the type of joint utilized, the muscular attachments, and the exercise procedures employed. While a given weight is appropriate for one exercise, it may be entirely unsatisfactory for use in another. It seems that there is some specificity of strength among the various joints of the body, a situation that may be accentuated when exercise is performed.

Conclusion

It has been suggested that "the advancement of any new field of medicine depends upon a parallel development of treatment, teaching and research, and that, in importance, research is by far the greatest" (9). The emphasis upon scientific investigation in adapted and corrective therapy as well as in physical education is greater today than it ever has been. We share a special interest in the field of progressive resistance exercise, and indeed there are many things yet that we do not know. It has been the purpose of this paper to bring together some of the information available in certain limited areas of exercise and exercise physiology in an effort to examine some of the concepts that direct our approach to the treatment of hospitalized patients.

REFERENCES

1. Carston, Dolly, The Influence of the Contraction Duration on Fatigue Curve Parameters in Dynamic Muscular Work, Unfinished Master's Thesis, University of California, Berkeley, California, 1959.
2. Clarke, David H., The Application of Measurement to Quadriceps Exercise Prescriptions, *Journal of the Association for Physical and Mental Rehabilitation*, 11:48-50, March-April, 1957.
3. Clarke, David H., Energy Cost of Isometric Exercise, Unpublished Paper, University of California, Berkeley, California, 1959.
4. Clarke, David H. and E. L. Herman, Objective Determination of Resistance Load for Ten Repetitions Maximum for Quadriceps Development, *Research Quarterly*, 26: 385-390, December, 1955.
5. Clarke, David H. and R. N. Irving, Objective Determination of Resistance Load for Ten Repetitions Maximum for Knee Flexion Exercise, Unpublished Paper, University of Oregon, Eugene, Oregon, 1958.
6. Clarke, H. Harrison, Comparison of Instruments for Recording Muscle Strength, *Research Quarterly*, 26: 398-411, December, 1954.
7. Clarke, H. Harrison, Relationships in Developmental and Remedial Physical Education and Corrective Therapy, Unpublished Paper, presented at the meeting of the AAHPER, Portland, Oregon, April 1, 1959.
8. DeLorme, Thomas L., *Progressive Resistance Exercise*, New York: Appleton Century Crofts, Inc., 1950.
9. Fleer, Paul F., Research: A Distinct Responsibility of the Corrective Therapist, *Journal of the Association for Physical and Mental Rehabilitation*, 7:184-185, September-October, 1953.
10. Fulton, J. F., *Muscular Contraction and Reflex Control*, Baltimore: Williams and Wilkins, 1926, from Henry, F. M., *Physiology of Work*, Berkeley: University of California Press, 1950.
11. Hettinger, T., Der Einfluss der Muskeldurchblutung beim Muskeltraining auf den Trainingserfolg, *Arbeitsphysiologie*, 16:95-98, 1955.
12. Hettinger, T. and E. A. Muller, Muskelleistung und Muskeltraining, *Arbeitsphysiologie*, 5:111-126, 1953.
13. Klein, Karl K., Progressive Resistive Exercise and Its Utilization in the Recovery Period Following Knee Injury, *Journal of the Association for Physical and Mental Rehabilitation*, 10:94-98, May-June, 1956.
14. Klein, Karl K. and E. Johnson, Research: A Method of Determining the Maximum Load, for Ten Repetitions, in Progressive Resistance Exercise for Quadriceps Development, *Journal of the Association for Physical and Mental Rehabilitation*, 7:4, July-August, 1953.
15. Kurimoto, Etsu, Effect of Inter-Contraction Rest Interval on Muscle Fatigue Curve Parameters, Unfinished Master's Thesis, University of California, Berkeley, California, 1959.
16. Rasch, Phillip J., Studies of Progressive Resistance Exercise: A Review, *Journal of the Association for Physical and Mental Rehabilitation*, 12:125-130, July-August, 1958.
17. Rasch, Phillip J. and R. V. Freeman, The Physiology of Progressive Resistance Exercise: A review, *Journal of the Association for Physical and Mental Rehabilitation*, 8:35-41, March-April, 1954.
18. Royce, Joseph, Isometric Fatigue Curves in Human Muscle with Normal and Occluded Circulation, *Research Quarterly*, 29:204-212, May, 1958.

VA HOSPITALS OPEN HAM RADIO NETWORK

A shortwave radio amateur network linking 30 Veterans Administration hospitals was opened by Dr. William S. Middleton, the VA Chief Medical Director, recently.

The first message was broadcast by Dr. Middleton from the Brooklyn, N.Y., VA hospital station WAZMAH to Dr. Joseph B. Bounds, manager of the Roanoke, Va., hospital at station K4UCD.

Other VA hospitals, in addition to the 30 now in the network, will join it during the coming year.

Shortwave radio is used in manual arts therapy, physical medicine and rehabilitation, for treatment of hospitalized veterans. The network also will provide an emergency means of communication in disaster periods and permit conversations between hospitalized patients and their families living some distance from the hospitals.

REHABILITATION CONTRIBUTIONS OF THE JOINT COMMISSION ON MENTAL ILLNESS AND HEALTH*

JOHN EISELE DAVIS, Sc. D.**

The Mental Health Study Act of 1955, passed by the 84th Congress, provided for an objective, thorough, and nationwide analysis and re-evaluation of the human and economic problems of mental illness. In support of this resolution, the following statements were made:

1. Forty-seven percent of the hospital beds in the nation are occupied by mental patients.

2. The direct economic cost of mental illness to the taxpayers of the nation, including benefits to veterans with psychiatric disabilities, is over one billion dollars a year, and has been increasing at the rate of one hundred million dollars a year.

3. The emotional impact and distress suffered by millions of our people, anxiously and justifiably concerned about the welfare, treatment and prospects of mentally afflicted relatives is incalculable, and is one of the most urgent concerns of our people.

For the implementation of this Mental Health Study Act, a Joint Commission, including representatives of the American Medical Association and the American Psychiatric Association, along with 36 participating organizations, contributed their experience, knowledge and ideas in the organization of the over-all study design.

It would seem appropriate that the topic for this paper should be selected by your program committee, as it appears to be pertinent to the professional interest of all the activity therapies and rehabilitation coordinators, representing and part of just about every aspect of life and living. The subject of mental illness reaches into almost all areas of modern life—cultural, spiritual, social, economic and political—and involves the mobilizing of community resources both psychiatric and non-psychiatric. The subject is so inclusive, indeed, that its scope must be clearly defined and limited to include the basic design of the studies carried out by this Commission, rather than the detailed results of these research undertak-

ings and the recounting of specific data which can be secured in the publications of the Commission, many in book form.

I am attempting here a general picture of the mosaic, and a glimpse into the concepts which have given form and direction to these research projects. Before getting into this aspect of the subject, however, and to give some general idea of the prevalence of mental illness: the studies have shown that at least 10% of the population in this country has some type of mental illness that is serious enough to warrant treatment if the sufferer wishes it. This means 17,500,000 persons in the nation. Of this group, 1,814,000 are in treatment in a year; 1,070,000 in hospitals; 379,000 in psychiatric clinics; and 365,000 to 451,000 treated by private psychiatrists. Denmark, Germany and the United States all seem to have the same degree of prevalence in hospitals, and this proportion is greater than Japan.

It was found, as had been indicated previously, that schizophrenics and the chronic syndromes of the pattern are the major psychiatric disorders of patients on first admission to public mental hospitals. One of the most encouraging findings showed a decline in daily census during the last two or three years in most large state mental hospitals, probably due to better treatment within the institution. There were about 52,000 fewer mental patients in 1959 than could be expected from the records of earlier years. In this regard, one must evaluate the increased public tolerance of discharged mental patients who are not entirely well, but feasible subjects for reevaluation, and the improvement of community facilities for handling them.

Coming back to the design for study projects organized by the Commission, the following titles of the Joint Commission Monograph Series is illustrative of the wide scope of its activities:

1. Current Concepts of Positive Mental Health
2. Economics of Mental Illness
3. Mental Health Manpower Trends
4. Americans and Their Mental Health—a Nationwide Opinion Survey

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5. The Role of Schools in Mental Health
6. Research Resources in Mental Health
7. The Churches and Mental Health
8. Community Resources in Mental Health
9. Epidemiology and Mental Illness, and
10. New Perspectives of Mental Patient Care

The blueprint for the survey of mental health and illness in the United States visualizes, in the words of the Commission:

... each individual as having within his life-span a given potential for mental health or illness, depending on a complex of forces affecting his behavior. These relate, so to speak, to the raw materials of which he is made, and to how these materials are shaped and molded through life experiences, some of which impose critical stresses. In this view, everyone will experience trouble, or feel troubled, at times. The individual may successfully cope with these stresses, or fail to do so, in varying degree. Mental health, it is generally agreed, springs not from avoiding stress or staying out of trouble, but from a capacity to accept normal amounts of stress with some ability to rebound or handle trouble. When he is unable to do so through his own resources, the individual may need help from one source or another. The blueprint, then, conceives the individual's behavior as a result of physical and psychological processes related to his constitution and the environment in which he lives. His adjustment to life, at any given time, may be thought of as (a) effective; (b) partially effective; or (c) ineffective. Internally, he may be thought of as (a) integrated and emotionally stable; (b) partially integrated; or (c) disorganized and unstable. He moves through life, and into and out of mental trouble in a manner depending to a considerable extent on how he functions and adjusts, or how he feels and others feel about him.

The study design was based on the assumption that not only within people, but within the nation as a whole, are (a) forces that tend to be health-permitting, growth-producing, and personality-strengthening; and (b) forces that tend to be disintegrating, illness-producing, and disorganizing in terms of the personality.

In order to provide an effective design for approaching these positive and negative forces, the Commission provided for an examination of life experiences of Americans on a sampling basis, not only to determine the incidence of mental illness but the critical situational factors in the life history of the individual which accounted for this most common American illness. One of the problems of such an exploratory study is to answer the question: "Just what, precisely, is mental health?" The Commission was unable to come up with a hard and fast definition. Dissatisfied with a primary focus on sick behavior, it has been argued that a new and broader perspective is needed if the subject of mental health as a positive force is to be made conceptually clear and practically useful. No completely acceptable, all-inclusive concept exists for physical health and physical illness, nor for mental health and mental illness. A program for the rehabilitation of the mentally sick does not de-

pend on the acceptance of a single definition, and should not, of course, await it. Dr. Jack K. Ewalt, Director of the Commission, states, "One value in American culture compatible with most approaches to a definition of positive mental health appears to be this: An individual should be able to stand on his own two feet, without making undue demands or impositions on others." In this connection, it should be pointed out that many physicians instinctively oppose an approach divorcing health from illness, as, in the words of Dr. Walter E. Barton, "alien to their own understanding of health."

Another subject considered by the Commission was manpower shortages. Analysis of this situation indicates that the United States has one psychiatrist for every 18,000 population—a total of 10,000 psychiatrists. Conservative estimates place current needs at 20,000. Of the 16,000 trained psychologists in the United States, only one-third are in clinical practice and directly concerned with the treatment of mental illness. Although there are 80,000 social workers in this country, only a tiny fraction of these are working in psychiatric fields. General hospitals staff one nurse to every three beds. Psychiatric hospitals have one nurse to every 53 beds!

The Commission cites Dr. Daniel Blaine, who states that the problems of personnel shortages in psychiatric services are so overwhelming, so well-known, and so frustrating, that they seem to threaten the very possibility of progress. The Commission's suggestion is (1) to train more personnel; (2) to distribute existing and anticipated personnel to achieve a more equitable balance between supply and demand; (3) to change our pattern of patient care so as to achieve a better utilization of available professional manpower; (4) to use new and different methods of treatment, either involving less highly trained personnel who are in greater supply, or techniques which enable us to reach larger numbers of patients per professional person; (5) to make an all-out research effort to discover ways of preventing or curing larger numbers of cases of mental disorder.

As to the availability of personnel, it was found that nearly 90% of all psychoanalysts in the United States are to be found in the 12 states with psychoanalytic institutes or training centers. Only 10% of the psychoanalysts practice in the 37 states without training centers or institutes. The Commission cites the experience of the Veterans Administration Training Program for Psychologists, including Houtchen's 1958 estimate that 67% of the 700 clinical psychologists now employed in the Veterans Administration have come through the training program.

In conceptualizing the problem of mental health research, the Commission states that such research can be looked upon as a dynamic entity existing in a socio-cultural field, an entity (a) receiving nutritional support from society in the form of money and approbation; (b) having structural and organizational characteristics; and (c) producing and sending back into the processes of society a flow of special knowledge. From this rather wordy concept, one can understand the complexity of the problem, and the difficulty of the public to visualize the image of research in mental illness. The public image of the patient and his home in the hospital becomes a factor in the promotion of such research activities. There is definite need for inter-disciplinary research and the widest utilization of research depends in the problems of communications. It is to the credit of the Commission that no conventional research design was recommended. The report states: "Crisp and definitive answers to all questions will not be obtained, nor will be achieved a completely empirical clothing for our framework, during the life of the Commission . . . The data explicitly or latently available will probably not go far toward completing the picture. It was necessary, therefore, to do some keen and complete understanding of the system and the most probable bearing on practical discussions concerning the scope and level and direction of the research effort in mental health."

The largest study of the entire survey was concerned with patterns of patient care and treatment. This was a broad yet intensive and most inclusive study. The hospital is conceived as an interdependent entity among many providing patient care and rehabilitation, and the programs examined pertained to in-patients, out-patients, and ex-patients. The procedures involve studies of pertinent literature, examination and study of research already performed, in progress, and being contemplated. Such questions as the following were asked concerning these research projects:

1. What hypotheses are being tested?
2. What kind of questions are being asked?
3. What are their findings?
4. How valid are they?
5. What frames of reference are being used?
6. What are the assumptions on which they are proceeding?
7. What answers can they supply to the questions we are asking?
8. What effect does research have on other aspects of hospital functioning?

The Joint Commission plans a systematic and

intensive look at the actual state of affairs in each of these facets of the mental health problem. It also plans to collate data on new ideas, new approaches, new departures, in each area of operation.

Out of these facts, and perspectives, and ideas, it hopes, through the consultative use of the best minds of the country, to formulate a new and comprehensive view of the nation's mental health problem, and make recommendations about desirable and necessary courses of mental health action.

DAY CENTER AIDS TRANSITION OF EX-MENTAL PATIENTS

The Veterans Administration opened its eleventh day care center for mental patients recently at Baltimore, Md. The centers are one of the new developments in psychiatry. Other VA day care centers are located in Washington, D.C., Baltimore, Philadelphia, Brooklyn, New York City, Boston, San Diego, Los Angeles, San Francisco, Providence, R.I., and Chicago (VA West Side Hospital).

These are one of a number of programs the VA is building up to help its mental patients make the transition from hospital to community life, such as half-way houses, foster homes, night hospital care, vocational counseling, and job placement.

The day centers are for patients who have had extensive psychiatric treatment but need social and occupational therapy to enable them to live outside the hospital. Libraries, music rooms, power tools, looms, ceramic kilns, and various games are among the facilities at the centers which are designed to build mental and physical fitness. Volunteers from the community assist VA staff members in the activities with patients.

"Our goal is to provide an environment in which long-hospitalized mental patients, especially schizophrenics, can grow into an active life," said Dr. G. J. Weinstein, VA outpatient psychiatry chief in Washington, D.C., "the day center activities encourage them to use dormant abilities in social experience and in simulated work settings."

DENTISTS AID DETECTION OF MOUTH CANCER

Dentistry is helping produce better health care for the aging in Veterans Administration hospitals. Dr. J. E. Fauber, the VA assistant chief medical director for dentistry in Washington, D.C., said the VA practice is for the dentist to complete the oral phase of the hospital patient's physical examination. This has the result of revealing many oral abnormalities, which are more common in older persons, and it also provides a basis for sound treatment planning, Dr. Fauber said.

He said about 400,000 hospital patients are given complete oral examinations by VA dentists each year, with the result that oral cancer has been recognized at an early stage in one of every 1,075 of these patients examined.

Early detection and treatment of oral cancer is especially important to the aging, since cancer occurs more frequently in latter years, Dr. Fauber pointed out. He said malignancies originating in the mouth and jaws still account for 5 to 10 percent of all deaths from cancer.

NEW PULMONARY RESEARCH CHIEF

Dr. James H. Matthews, assistant chief of pulmonary disease service at the Oteen, N.C., Veterans Administration hospital, has been appointed chief of the Veterans Administration's clinical research in pulmonary diseases. He also will coordinate the large-scale VA-Armed Forces cooperative studies in pulmonary diseases.

He succeeds Dr. James W. Raleigh, who left the VA to become medical director of the American Thoracic Society, medical arm of the National Tuberculosis Association in New York City.

GIVE THEM THE KEYS TO SERVICE*

CARL HAVEN YOUNG, Ed. D.**

Service is the rent we pay for the space we occupy and it would appear that the landlord in some instances is losing money on our occupancy in this life. It cannot be presumed however, that the individual who selects the corrective therapy vocation for a career is to blame for any inadequacies, for he may not have been given the proper keys in his preparation for complete understanding in order to adequately contribute through his services.

At present there are certain doors that are closed to us and which are hindering our acceptance as a definite part of the paramedical team. Recognition of these barriers and the providing of the proper keys to prospective candidates which will aid in opening these locks is therefore essential. A few of the obstacles which must be removed are herein suggested.

It would seem that in our urgency to procure additional personnel to compliment and meet present demands, we are guilty of being willing to accept a product that is only partially ready to assume a position of responsibility. It is assumed that whatever may be necessary will be gained through experience and this is a fallacy in that present practices may not have advanced in keeping with new trends and procedures.

In many instances there may be found a lack of uniformity in background, which includes length, breadth and depth in the didactic phase together with a wide variety of clinical experiences to enhance the theoretical applications. Until recently our Association had failed to determine just what the professional credentials of its members should be, but in 1959 at the Miami Beach Conference, the Board of Governors approved the recommended Professional Standards and Accreditation Procedures. This need for definite standardization was therefore accepted with the firm conviction that as soon as feasible, our Association would insist upon compliance as to a requisite uniform curriculum and eventually accreditation of all educational and clinical affiliations, as well as certification of the entire membership previous to recommending employment, as is practiced in some other therapies.

In the past there have been educational institu-

tions which were lacking in proper basic requisites for a major in physical education and other subject content. Likewise there has been a shortage of properly trained teaching faculty to offer a full complement of didactic courses, and the hospital staff has attempted to fill this gap. This is not its responsibility for the teaching of the theoretical courses is the obligation of the educational institution, while the clinical aspect of application falls within the scope of those in the hospital or clinical situation.

It is true that the members of the corrective therapy field are usually first qualified as teachers, yet there must be a definite delegation and sharing of assignments in keeping with the qualifications of those instructing. If colleges and universities are accepted as being essential to medical recognition then they too must have a definite place in the program and charged with full responsibility for adequate competence of their graduates.

Another factor that justifies such a division of assignments is that the school assumes its full share of participation toward preparation. Thus, those who complete their work under the robe of authority of an accredited and recognized educational institution gain personal recognition and add stature to the entire corrective therapy profession.

Full significance of these "locks" cannot be overlooked and there is no one skeleton key which will fit all of them. Unquestionably, there will be found common denominators where the keys may be similar in unlocking doors in comparable situations, but until basic problems are recognized and the procedures for solving them, each difficulty must be considered separately.

If our key ring is to be sufficiently complete to give us *open sesame* to the ever broadening opportunities for service, there must be included a wide variety of keys which will release every potential attribute of value. Some of the master keys which must be utilized are those which give us admittance to areas to which it is as yet difficult to enter. Of major importance are the following problems of concern for which the proper keys must be found.

Definite means must be formulated for changing the perspective of those institutions which are perfectly satisfied with their present curricula. They must be made to realize that the quality of their programs must be implemented and cannot remain static if they are to satisfy the standards approved by the medical profession.

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If the full strength of this field of specialization is to be brought together for maximum cohesive action, all possible techniques should be fostered which will make for greatest unity. Those who are earning their livelihood through the use of our modalities should comprehend that our membership is desirable and that our contributions will assist in speeding the progress of mutual endeavors. Togetherness must mark our every attempt to gain distinction for our profession and unless all are ready to accept their obligations and share equally in the responsibilities, we do not deserve a place in the achievements which may be attained.

Adapted physical education and corrective therapy are considered as a conjoined discipline, differing mainly in the operational situation. Commonalities, unique functions, and significant advantages to be gained from a dual approach must be ascertained, for it is important that each of us understands our role and the distinctive differences in adaptation within the facility. These are our own professional colleagues and we should be jointly striving to discover better ways for achieving common goals, but to do so it is necessary that these special teachers in the schools be encouraged to become a part of our Association. The same is true of specialists engaged by the private physician, clinics, and other institutions.

The joining of forces with recreation therapy is a measure that is to be desired since the similarity of background makes such a liaison possible. That such an affiliation would be of benefit to both groups is unquestioned for while our organization would profit through the increase in membership, they too would be enabled to gain more quickly the recognition which is so essential. Similarly, this phase of rehabilitation might utilize the assistance of our leaders in the developing of professional criteria for the preparation of such specialists, and thus enhance their chances of becoming an integral part of physical medicine and rehabilitation.

Extending horizons of influence are constantly being found where corrective therapists are particularly adapted and qualified to serve. Special keys must be designed which will make possible an extension of adequacy and teach us how to select the right key for the lock which it will fit.

Today there is need for greater technical skills and scientific knowledge concerning individuals. We should become more capable in the recognition of persons' weaknesses, development of great potentials, habilitation or maintenance of abilities, and rehabilitation of the atypical. There is an increasing demand for those with a knowledge of movement, its char-

acteristics, and the know-how to best make use of this great force for good.

Application of this philosophy is of importance if we are to assist those who are physically and mentally under par; meet growing requests for help in contrasenescence or control of aging; and particularly in working with the normal adult to maintain a state of fitness.

It is evident that the challenge to our profession is unlimited, and I am sure you will agree that whatever keys there may be, they will be of little service unless they are given to competent and reliable persons, who as experience is gained, become expert in the use of these tools.

Every security measure must be taken to select for future investment those individuals with greatest potential, who are sincere in the desire to achieve a high degree of quality professionally, and who above all become dedicated to service for the good of mankind. It is in the hands of such leaders that our keys to service should be given.

"From Other Journals"

C. Craig, Muscular Effort and Posture in Hiatus Hernia. *Medical Journal of Australia*, II:178-180, July 30, 1960.

The purpose of this paper is to reveal under what everyday and every-night activity a hernia may be forced into its sac, as revealed by studies of 100 patients. In no case could herniation be induced by muscular effort when the patient was in the standing position. Slumped sitting positions, as in motor-car driving, or flexed positions of the upper body, as in defecating, may produce it. Patients should be trained to sit upright. Bending forward, as in touching the toes, produces hiatus hernia. Digging is probably safe, but the full squat should be avoided. A tight belt greatly exaggerates the effect of passive pressure in stooping and is dangerous. In sleeping supine the stomach is drawn away from the hiatus, but the secretions are at the fundus. The left lateral position is a good one, but the right lateral position tends to empty the stomach contents into the sac and is unsuitable. The prone position is effective in drawing the stomach away from the hiatus.

Mary Steichen Calderone, I'm Only Half There. *American Journal of Public Health*, 50:1368-1369, September, 1960.

In talking about absenteeism of women in industry, we refer to physical absenteeism. What about psychological absenteeism. Galdston said, "A woman is a uterus surrounded by a supporting organism and a directing personality." When a woman says "I'm only half here" it usually means her essential self is lingering in that area that is central to her life. Men laugh, for people scoff at what they do not understand. Public health must be aware of the need for study of this area and the nature of its component parts—abortion, frigidity, promiscuity, childlessness, venereal disease, sex needs, disparity of sexual appetite between partners can involve disabling emotional conflicts. Few of us are uncrippled by the mores, taboos, and distorted attitudes our society inflicts upon us. In helping women in trouble in this area we shall be helping ourselves.

John A. Halliday, Blood Flow in the Human Calf After Prolonged Walking, *American Heart Journal*, 60:110-115, July, 1960.

Black concluded that slow walking increased the blood flow in the calf sufficiently to supply the needs of the tissues, but that quick walking did not, since the post-exercise hyperemia under these conditions was considerable. The purpose of this investigation was to extend Black's observations to more natural walking over longer distances.

Venous occlusion plethysmography was used to record the blood flow in the calves of 3 male medical students after rest and after walking various distances at two different speeds. The results agreed with those of Black. At 5 m.p.h. hyperemia was greater than at 3 m.p.h. It appears that the normal resting blood flow is capable of removing any metabolites built up from exercise and that these metabolites may cause a larger increase in blood flow than is necessary for their removal. There appears to be little increase in blood flow in the skin resulting from direct heating of the skin by the muscles.

Joseph Berkson, Smoking and Cancer of the Lung. *Proceedings of the Staff Meetings of The Mayo Clinic*, 35:387-385, June 22, 1960.

The cause of cancer is unknown, but it seems very doubtful that smoking causes lung cancer. Pathologists and clinicians have failed to substantiate this from their experience, and cancer does not develop in fingers long stained with cigarette tars, in smoker's sore throat, in smoker's bronchitis, or in laboratory attempts to produce it in animals by means of smoke. The theory that tobacco smoke contains carcinogens that when inhaled with the smoke produce cancer is reasonable. Detailed statistical studies, such as those of Doll and Hill, Hammond and Horn, and Dorn have shown that there is a statistical association between smoking and death from all causes. This suggests that the data are spurious or that smokers are of a different constitutional type than non-smokers. There is much to support the latter view, but there are several alternative explanations, such as decreased deaths from other causes which are more successfully treated. European scientists opine that the alleged connection between smoking and lung cancer does not deserve serious consideration. If smoking is responsible for a higher death rate from all diseases, a fundamental biologic force of which we are ignorant is involved. Unless this possibility is thoroughly investigated, it must be concluded that the statistics which have been presented are not really considered significant.

E. R. Buskirk and W. P. Beetham, Jr., Dehydration and Body Temperature as a Result of Marathon Running. *Medicina Sportiva*, XIV:493-506, September, 1960.

Runners in the Boston Marathon, Brighton Road Race, and a practice race were observed. It was found that losses in body weight were 6.0%, 4.8%, and 4.1% respectively from the starting weight. The per cent of body water loss averaged 5.9%, 4.2%, and 3.4% respectively from the starting weight. Skin temperature invariably decreased, the average drop being 8.3°F. in the Boston Marathon and 4.1°F. in the Brighton Race. Rectal temperatures were elevated 3.4°F., 2.7°F. and 2.2°F. respectively in the three races. These are within the limits commonly observed for severe activity. The net weight loss and the rectal temperature correlated 0.58, significant at the 0.01 level. While acute dehydration is known to impose considerable stress on the body and this is said to become evident when dehydration has reached 2% of body weight loss, no performance decrement was observed in these runners. Well-conditioned men running in a cool environment appear to tolerate a 3-7% dehydration rather well. A weight loss of 1% due to water decrement is associated with approximately an 0.5°F. increment in rectal temperature. Thus dehydration on the order of 2-3% may reduce warm up time, and might be of value in short or middle distance races. In long races too large a dehydration might develop unless fluid were taken during the race.

Alf Holmgren and Gunnar Strom, Vasoregulatory Asthenia in a Female Athlete and DaCosta's Syndrome in a Male Athlete Successfully Treated by Physical Training. *Acta Medica Scandinavica*, 164:113-118, 1959.

A female competitive skier showed a low physical working capacity i.e., capacity of the circulatory system to transport oxygen to the working muscles) in relation to body size and to amount of hemoglobin and heart volume. She was diagnosed as a case of vasoregulatory asthenia (inadequate adjustment of peripheral blood flow) and placed on a program of intensive daily training, with iron medication. Her physical working capacity became normal, and she participated successfully in skiing competitions. A male skier had by accident three repeated venous air embolisms during blood donation. He was diagnosed as near vasoregulatory asthenia without signs of myocardial functional insufficiency. A graduated program of physical training brought him back to normal working capacity.

Alf Holmgren and Tore Strandell, The Relationship Between Heart Volume, Total Hemoglobin and Physical Working Capacity in Former Athletes. *Acta Medica Scandinavica*, 163:149-160, 1959.

A group of former racing cyclists was examined in order to compare the relationship between heart volume, total hemoglobin, and physical working capacity in non-active middle-aged athletes. The circulatory system of the old athletes was characterized by low total hemoglobin (mean 735.5 g) in relation to body weight, normal blood volume (mean 5.46 l) in relation to body weight, large heart volume (mean 1.080 ml.) in relation to total hemoglobin, and normal physical working capacity. Subjects who had continued moderate training had a higher work capacity than did those who had not. A remarkably high incidence of pathological ECG changes at rest and during work was noted. Mean vital capacity was 4.62 l.; mean pulse rate, 61.4 supine, 75.9 standing.

Archana Basu, R. Passmore, and J. A. Strong, The Effect of Exercise on the Level of Non-Esterified Fatty Acids in the Blood. *Quarterly Journal of Experimental Physiology and Cognate Medical Sciences*, 45:312-317, July, 1960.

Many physiologists have considered that CHO is the sole fuel of muscle, and that fat is converted into CHO before being utilized for muscular work. Biochemists, however, doubt that the body can do this. Non-esterified fatty acids (NEFA) although normally comprising only about 5% of the total lipids in the plasma respond to physiological stimuli and may be the form in which lipids are transported from the depots of adipose tissue for utilization by the muscle. In this investigation it was shown that during treadmill walking at a moderate rate there is a marked rise in NEFA level in the plasma. The observations were consistent with the view that the muscles use NEFA from the plasma as a source of energy and that thereafter fat may be mobilized in excess of immediate needs, and a rise in plasma NEFA results.

R. P. Goulden, Sports Medicine. *Lancet*, 7157:982-983, October 29, 1960.

A very small minority of the medical profession treat sports injuries with good results. Athletic injuries are a specialized field, but good results can be obtained by anyone who follows a few simple rules. These are:

1. Make an exact diagnosis.
2. Promptly reduce and eliminate traumatic swelling.
3. Use an easily removable splint to rest and support the damaged structures.
4. Carefully administer isometric exercises performed with the splint on to maintain the power of the muscles and isotonic exercises with the splint off to increase the range of movement of the joints affected and to prevent formation of adhesions.
5. Correct postural faults, to remove strain from the affected joint.
6. Make sure that damaged muscles regain their full length in relaxation.
7. If necessary manipulate the joint or stretch the muscle under general anaesthesia.

L. G. C. E. Pugh, et al., A Physiological Study of Channel Swimming. *Clinical Science*, 19:257-273, 1960.

The purpose of this study was to determine why Channel swimmers may swim 12-22 hours in water at a temperature of about 60 degrees F. when shipwrecked persons survive in water of this temperature for only 4-6 hours. Subcutaneous fat thickness, total body fat, somatotype, and respiratory exchanges were determined on swimmers during the 1955 cross-Channel Race. All swimmers were fatter than average individuals; a man does not take up long-distance swimming unless he is fat because he cannot stand the cold. The fastest swimmers were those with the least fat. Low rectal temperatures are associated with the onset of fatigue and a reduction in heat production. Thickness of the subcutaneous fat is decisive in tolerance of cold water. For the same reason a layer of lanoline or vaseline may aid to conserve body heat. Total body fat was less than in average men of the same height and weight, indicating the swimmers have a larger muscle mass. Energy expenditure on a Channel swim is estimated to be of the order of 10,000-12,000 KCal. The greater part of this energy must be derived from fat; possibly these swimmers have an unusually well-developed capacity for metabolizing fat.

Editorial, Athletic Performance. *British Medical Journal*, 5200:721-723, September 3, 1960.

Indulgence in strenuous athletic events is not apt to be dangerous or lead to cardiac disability in later life. Evidence pointing to the protective effect of physical exercise against coronary-artery disease has been put forth by Morris and Crawford.

Muller and Hettinger have shown that if muscle groups are contracted once a day to exert a force of the order of 50% of the maximum possible, there is a steady increase in the maximum strength of the muscles. Further, the rate of increase is not affected by the number of contractions exerted each day. This is astonishing and it is important to repeat and confirm this work.

Gentle exercise is unlikely to be of value to athletes so far as improvements or increases in muscular strength is concerned. Training should be carried to the point of exhaustion if athletic performance is to be improved.

Success in endurance events depends upon the efficiency of the respiratory and circulatory systems. The effect of training on the pulmonary diffusing capacity is unknown. The properties of the membrane separating pulmonary gases from the blood may be altered by training, although the mechanism which would do this is not evident.

Bernard D. Karpinos, Fitness of American Youth for Military Service. *Milbank Memorial Fund Quarterly*, XXXVIII: 213-247, July, 1960.

Moral, mental, and medical criteria determine the individual's fitness for military service. The examinations and acceptance standards of each have been changed from time to time as manpower needs dictate. At the present, for instance, psychoneurosis of any degree is acceptable if it has not incapacitated the individual in civilian life.

During the Korean War 3,500,000 registrants underwent a preinduction examination, of whom 31.8% were rejected. Of these 0.8% were rejected for administrative reasons (nearly all moral), 13.3% for mental reasons, 3.3% for combined mental and medical reasons, and 14.4% for medical reasons only. These disqualification rates are inflated by the fact that many youths entered military service other than through the Selective Service. Statistical adjustment for this indicates that 23.6% of the applicants could not qualify for military service. Diseases and defects of the bones and organs of movements were the main cause of medical disqualifications (20 per 1000), followed by psychiatric disorders (18.6/1000), circulatory system diseases (17.8/1000), digestive system diseases (11.2/1000), eye diseases and defects (9.8/1000), and various lesser causes. Many were rejected for more than one reason. The main cause for rejection due to psychiatric reasons was character disorder.

Charlotte M. Young, Exercise and Weight. *New York State Journal of Medicine*. 60:2449-2452, August 1, 1960.

The greatest single nutrition problem in the U.S. is obesity. Body weight is a balance between energy taken in as food and drink and energy expended in the basic processes of the body and in activity. Accumulation of fat may be due to excessive energy intake or excessively small energy output. As activity decreases in our culture, many reach the point where the requisite reduction of food intake leaves them semi-hungry most of the time. When activity is reduced below a minimum, a corresponding decrease in food consumption does not occur, and obesity develops.

Exercise is the only practical way to increase energy expenditure. It is a practical tool for the treatment of obesity only if it is carried out frequently consistently, and in moderation. A dietary excess of only 80 calories a day for a sedentary individual weighing 165 pounds will cause an increase of 13 pounds in five years. If such a man walks a mile a day at a moderate speed he will use up slightly over 80 calories and thus maintain his energy balance.

A. Taylor, Some Characteristics of Exercise Proteinuria. *Clinical Science*, 19:209-217, 1960.

It is well known that severe physical exertion can cause normal subjects to lose protein and red blood cells and casts in the urine. Suggested explanations have included mechanical trauma to the kidneys, direct effect of circulating metabolites on glomerular permeability, and changes in renal circulation. In an attempt to decide between these suggestions, fifteen service men were studied. It was found that those subjects unaccustomed to exercise and most tired by it tended to excrete the most protein. Proteinuria and pulse count correlated $r=.70$ (P less than .001.) This is consistent with the view that circulatory changes are responsible for proteinuria. The relative importance of vasoconstrictor nerves and circulating adrenal medullary hormones in causing renal vasoconstriction during exercise is not clear.

A. Cantone and P. Cerretelli, Effect of Training on Proteinuria Following Muscular Exercise. *Internationale Zeitschrift Fur Angewandte Physiologie Einschliesslich Arbeitsphysiologie*, 18:324-329, 12 July 1960.

Strenuous muscular exercise ordinarily induces a transient proteinuria whose extent is related to the intensity of exercise. In this paper the effects of a standardized exercise (running) on proteinuria was observed in trained and untrained subjects. The proteinuria after muscular work is less in trained men than in untrained men. The increase in serum protein level is probably connected with haemoconcentration due to water flow from blood to muscles consequent to increase of the osmotic pressure in muscles during strenuous anaerobic exercise. Exercise proteinuria may be related to an increase of 1-noradrenaline in the blood which may act on the kidneys to cause an increase of time of contact between blood and renal tissue so that more protein molecules filter through; an increased permeability of the glomerular substance to proteins; and/or a reduction of tubular reabsorption for albumins. Probably all three factors are involved. The trained man probably has a lesser output of 1-noradrenaline.

Harold Cohen and Cissie Goldberg, Effect of Physical Exercise on Alimentary Lipaemia. *British Medical Journal*, 5197:509-511, August 13, 1960.

The increase in turbidity of blood plasma after a fatty meal is a familiar observation. Its duration and intensity are of particular interest because patients with coronary artery disease tend to exhibit delayed clearing of this visible lipaemia. Twenty-two medical students were given a standard breakfast, after which part of the group rested and part exercised. Ten days later the observations were repeated but the groups were switched. Blood samples were taken before breakfast and at 3, 5, and 7 hours after the start of the meal. In a significant number of cases the plasma turbidity was less after exercise than after resting.

J. D. G. Troup, Sports Medicine. *Lancet*, 7152:699-700, September 24, 1960.

Sports medicine is not a recognized specialty in Great Britain, although centers for research in sport exist in Finland, Sweden, Russia, and West Berlin. In Great Britain attempts to prevent permanent damage and to provide first aid and rehabilitation after injury constitute the service offered by medicine. The minor injuries and strains of the athlete are closely related to rheumatism, fibrositis, lumbago, or neuritis. All represent deviations from normal mechanical efficiency. The more we learn from the disabilities and difficulties experienced by athletes, the better we can help the tired middle-aged housewife. Almost invariably degenerative processes begin with a minor injury. A patient with a disability must go into training if he wishes to live a normal life. The sooner we learn the extent to which our wellbeing depends on the mechanical and functional efficiency of the body, the better. "Sports medicine" is more likely than anything else to provide the answers.

Unless noted otherwise, all abstracts have been prepared by Philip J. Rasch, Ph.D.

DEEP SQUAT—Cont'd from P. 11

Actually the "split style squat" action in weight lifting apparently does not have this stretching effect on the knee ligaments and can be justified from the standpoint of anatomical and kinesiological action. A number of competitive lifters tested who have only used this method in training have demonstrated sound ligament structures on test.

In the specific case of the athlete there is enough available evidence to show that he needs all of the stabilizing parts of the joint functioning at maximum capacity to keep him active in sports and these parts are *namely strong ligaments which are considered the first line of defense against injury* and also maximum bilateral balanced strength of the musculature that surrounds the joint and supports it against the forces that are applied in contact and twisting and turning actions.

It is hoped that thoughtful consideration will be given to the findings of this research and that all those deeply concerned with the physical welfare of the young people with whom we work in physical education, athletics and training will begin to re-evaluate their exercise programs that are concerned with the problem of leg strength and ligament stability.

REFERENCES AND BIBLIOGRAPHY

1. Voshell, A. F., Anatomy of the Knee. *Am. Acad. of Orthopedic Surgeons, Instructional Course Lecture*, Vol. X ill, 1956.
2. Steindler, Arthur, *Kinesiology of the Human Body Under Normal and Pathological Conditions*. Springfield, Ill., Chas. C. Thomas, 1955.
3. Helfet, A. J., Mechanics of Derangement of the Medial Semi-Lunar Cartilage and Their Management. *Jrnl. Bone and Joint Surgery*, 41-B: 2, May, 1959.
- Clayton, M. L. and G. J. Weir, Experimental Investigations of Ligamentous Healing, Sports Injuries, *Am. Jrnl. of Surgery*, 96, Sept., 1959.
- Colestock, C. and C. L. Lowman, *Fundamental Exercises*

for Physical Fitness. New York, A. S. Barnes & Co., 1946.

Grimek, J. C., How Good is the Squat? *Strength and Health*, Aug. 1950.

Klein, K. K., Research: A Series of Case Study Reviews of the Non-Effectiveness of Progressive Resistive Exercise for Re-establishing Ligament Stability. *Jrnl. Nat. Trainers Assoc.*, p. 12-15, Winter, 1960.

Klein, K. K., Recent Research Findings in the Problem of Knee Injury in Athletics and the Implications of Preventive Conditioning. *Am. Coll. of Sports Medicine, Transactions of the 6th annual meeting*, p. 43-45, June, 1959.

Lewin, D. L., *The Knee and its Related Structures*. Philadelphia, Lea & Febiger, 1952.

Lowman, C. L. and C. H. Young, *Postural Fitness*. Philadelphia, Lea & Febiger, 1960, p. 173.

McCloy, C. H., Exercise Programs to Strengthen Ligaments of the Knee and Ankle. *Nat. Fed. of State H.S.A.A.*

Mosley, H. F., Disorders of the Knee. *Ciba Clinical Symposia*, 5:6, Nov., 1953.

Murray, Jim, Full Squats for Football? *Iron Man*, 18:5, Feb.-Mar., 1959.

Murray, Jim and Peter V. Karpovich, *Weight Training in Athletics*. Englewood Cliffs, N. J., Prentice-Hall, Inc. p. 118-119.

Book Reviews

Index and Abstracts of Foreign Physical Education Literature, Volume V, edited by Herbert W. Olson. (Indianapolis: Phi Epsilon Kappa Fraternity, 1960, 64 pp.)

The first thing the reviewer notices is the shrinkage of the coverage by the *Index and Abstracts*. Volume II contained 287 items; Volume V contains just one half—143—of that figure. This might well be acceptable if better coverage of the items listed resulted, but this is not the case. Year after year this publication continues to perpetuate editorial weaknesses which annually have been brought to the editor's attention.

Here again the reader is confronted by incomplete citations (16 of them give no year of publication); abstracts which are useless ("Observations from the 1959 World Championship which was held in Dortmund;" "The discourse is accompanied with a number of photographs;" "The profession is explained"); a failure to make use of other readily available sources (only two items from the "From Other Journals" columns of this *Journal* are included); a failure to furnish abstracts of several articles which were published in English and thus offer no difficulties to the summarizer. One decidedly obsolete item (1924) is included; at least one item from an American publication (*Federation Proceedings*). Presumably the mention of "Indiana clubs" and "fency" are simply typing mistakes. It is noted that Hettinger and Mueller's "Performance and Training of Muscles" is still not included among "Complete Translations," although this was furnished to the fraternity some years ago. Reviews of pertinent foreign books could easily and profitably be added.

The index is compiled by a Contributing Editor of this *Journal*, William R. Pierson Ph.D., and it is observed that it now indicates which items are cited by title only, as was suggested in this column on the occasion of the review of the previous edition.

The *Index and Abstracts* is no doubt worth the price which is charged for it, but with only a modicum of editorial care could be made worth much more.

PJR

Disc Lesions and Other Intervertebral Derangements, by E. J. Crisp. (Edinburgh: E. & S. Livingstone, Ltd., 1960. American distributor: The Williams and Wilkins Co., Baltimore, Md. 153 pp. \$3.75.)

The emphasis in this little book is on conservative therapy, especially traction and manipulation, with brief discussions on anatomy, physiology, mechanics, and diagnosis as they relate to therapy. The material is clear, concise, and reads quite easily. Crisp advises that mobilizing the spine by manipulation and traction should be initiated almost routinely in chronic low back pain, particularly when backache is increased by bed rest and relieved by mild activity. Further suggestions are practical and valuable. However, anyone who expects to learn manipulative technique from a book will find his path liberally sprinkled with pitfalls.

By virtue of emphasis, exercises appear to be assigned a much lesser role than appropriate manipulation, traction, and immobilization. The exercise regime advocated for the acute or chronic low back is one that is apparently favored in reports from English sources, i.e., spinal extension with the avoidance of lumbar flexion, while curiously physicians in this country favor exactly the opposite.

This reviewer wonders why Crisp implies that all cases of brachial neuritis arise in the neck and neglects that small but not rare group in which a true brachial neuritis is limited to the brachial plexus, as demonstrated by physical diagnosis, electromyography, and occasionally at surgery. He is also puzzled as to the origin of "the oxygen (which) rushes into the vacuum formed within the zygapophyseal joints as their articular surfaces separate."

Recommended reading for all interested in the management of back pain.

DJS

Statistical Analysis in Psychology and Education, by George A. Ferguson. (New York: McGraw-Hill Book Co., 1959, 347 pp., \$7.00.)

The text by Ferguson is the first this reviewer has encountered which presents an adequate coverage of statistics in a manner understandable to the average behavioral scientist. Most authors of statistics texts would rather be accused of thaumaturgy than of writing a "cook-book." Consequently such texts imply a statistical prerequisite just to interpret the runes. In general, if one can understand the text, he doesn't need it. Happily, Ferguson's book is not of this nature. It is far from being a "cook-book," yet even a person whose statistics courses are in the fading past should be able to understand and apply the appropriate techniques without exposing his naivete.

Certain chapters of the book are particularly valuable to persons not in everyday contact with statistical inference; those on basic ideas in statistics; probability, transformations, and errors of measurement being particularly noteworthy. The chapter on selected nonparametric tests will be of considerable value to behavioral scientists by enabling them to draw appropriate inferences from nominal and ordinal scale data. Too many today are applying inappropriate parametric tests to such data.

If the behavioral scientists could afford but one statistical reference book, this should be it.

WRP

Reading Disability, by Knud Hermann. (Springfield, Illinois: Charles C. Thomas, 1959, pp. 183. \$5.50.)

The theme of this easy-to-read book is that reading disabilities are a part of a larger pattern of symptoms related to the problem of using symbols. The title might well have been "Reading and Writing Disabilities." Hermann, a Danish physician, reviews the literature in the field of his study and stresses the hereditary factors related to poor reading. He shows that the symptoms of a poor reader are closely related to Gerstmann's Syndrome, and concludes that a reading disability is a "disturbance of directional function." By design, no attempt was made to include material on reading therapy.

NWF

Physical Disability—A Psychological Approach, by Beatrice A. Wright. (New York: Harper & Bros., 1960. 408 pp. \$6.00)

The available objective evidence . . . forces one to the conclusion that there has been a gross oversimplification of the connection between physical impairment and maladjustment.

The above statement by the author does not assert that "physical disability plays no role at all in the development of inferiority feelings or other problems. It does imply, however, that the objective fact of disability is an extraordinarily poor criterion for judging which individual is unduly beset by self-abnegation and which individual is not, and that the common association between inferiority feelings and a typical physique is a gross oversimplification unwarranted by the facts."

Beatrice A. Wright's outstanding background—psychologist, teacher, consultant, author and co-author of books and numerous articles, and award recipient—well qualifies her above conclusion, as well as her other concepts and interpretations which she so carefully and interestingly documents in this book.

Physical Disability uses as basis for discussion not separate disability categories (as blindness or crippling) but rather situations common to all disability groups of all ages. Concrete examples are cited profusely throughout the discussion. Both factors within the person and factors attributable to the environment are considered in terms of how they aid—or hinder—psychological adjustment.

The first part of the book analyzes some important problems and solutions arising from the social and personal evaluation of a disability; the second, more clinical part, is concerned with the practical problem of how the person himself and the parent may be effectively encouraged to meet the challenge imposed by disability. Throughout, attitudes and their origin are examined critically, especially as they bear upon psychological rehabilitation. The final chapter discusses the heritage of somatopsychology and underscores essential findings and conclusions. Research is introduced as it bears on psychological problems and issues under discussion. A minimum of technical language is used. This book is highly recommended for professional, students-in-training, and all others concerned with somatopsychological problems and with rehabilitation.

CTS

Psychoanalytic Concepts of Depression by Meyer Mendelson. (Springfield, Illinois: Charles C. Thomas, 1960. pp. 170. \$6.50)

With an increasing recognition of the depressive reactions as one of the major areas of emotional illness, this book represents an important addition to the reference library of the psychiatrist, psychoanalyst, psychologist, and historian who may wish to add to his knowledge of the developmental concepts of motivation in the depressive reactions.

The survey is integrated, comprehensive and brings "up to date" the methods of approach of those analytic workers who have contributed most to present theories in the United States and Europe. From pre-Kraepelin concepts through Abraham, Freud, Radl, Gero, Melanie Klein, Bibring, Edith Jacobson, Mabel Blake Cohen, and recent theories of lesser importance, the survey chronologically analyzes the basic roots of present theories. The variety of depressive reactions and diagnostic considerations as they relate to theory is reviewed. In conclusion, the author reflects upon the scientific accomplishments and failings of the theoretical and empirical literature which he has reviewed.

This book provides an excellent background for basic understanding of the depressive reactions. For the teacher and clinician it provides material which to the reviewer's knowledge is not available from any other single source. It is one of those books which deserves a place on the scientist-psychiatrist's reference shelf along with Meyer, Lewin, and Fenichel. Bibliography and Index are excellent.

DCL

Transactions of the Sixth Annual Meeting of the American College of Sports Medicine, Maurice E. Tannehill, Editor. (Privately printed: Copies available from Grover W. Mueller, Board of Education, Parkway at 21st Street, Philadelphia 3, Pennsylvania, n.d. 82 pp. \$1.15 Paper.)

The title implies that this is a record of the 1959 meeting of the American College of Sports Medicine. The material is published in much the same sequence as it was presented. However, whereas this made sense in the original presentation, it does not make for continuity when printed. For example: the after-dinner speeches were presented on the evening of the first day of the meetings; they appear somewhat incongruous between the second and third scientific sessions in the text. There was considerable pertinent material presented at the scientific sessions, but this material is not easily found in the published *Transactions*. Rather than a table of contents or index, the Program is presented. This is an awkward means of locating material, further complicated in the present instance by the fact that in some cases there is no similarity between the program listing, the actual presentation, and the material published in the *Transactions*. It is noted that in some cases the discussions following the sessions were not completely recorded. This is unfortunate, for among those for which no discussion is recorded is one which elicited considerable controversy. Curiously enough, neither does the controversial part of the presentation appear in the published *Transactions*.

This is the first official publication of the American College of Sports Medicine, and it should be complimented for producing a single volume of material which until now has required extensive searching in the literature of allied fields. It is to be hoped that the *Transactions* can be nurtured into a periodical which will take its place alongside such as *Medicina Sportiva*, *Sportartzliche Praxis*, *Medicine*, *Education physique*, *et Sport*, *Sportnomediscinske Objave*, and *Revista des Medicina Deportiva*.

WRP

Fractures & Orthopedic Surgery for Nurses and Physiotherapists, by Arthur Naylor. (Edinburgh: E. & S. Livingstone Ltd., 1960. The Williams & Wilkins Company, Baltimore, exclusive U.S. Agents. 358 pp. \$6.50.)

As stated in the title this book was written for nurses and physiotherapists, and represents the usual fine clinical approach that characterizes British medicine. Beginning with rather complete coverage of orthopedic apparatus, operating theater technique, and general methods of correction of deformity, the book proceeds to deal with specific problems of amputations, fractures and dislocations, diseases of the bone, joints, soft tissues, etc. Problems of a congenital nature and those resulting from paralysis are also considered. The fundamental approach to understanding the problem, and therefore the basis for care, makes this book a very practical and functional one for the person responsible for the all important complement to that care given by the orthopedic surgeon.

MLB

Advanced Judo and Self-Defence, by Pat Butler. (London: Faber & Faber, 1960. 109 pp. \$2.10.)

Here is an excellent text for the person who already has a sound basis in judo. Two chapters deal with counter throws and continuation throws, which comprise perhaps the clearest distinction between the expert and the merely competent judoka. Two chapters are concerned primarily with *atemi* (striking techniques) as used against both armed and unarmed foes. A very interesting section discusses the use of the umbrella and the cane for self-defense. The reviewer does not recall having seen this described elsewhere. Other material deals with instructing, organizing judo clubs, and like matters. The book is well illustrated and contains an index. It is highly recommended.

PJR

Statistics Manual, by Edwin L. Crow, Frances A. Davis, and Margaret W. Maxfield. (New York: Dover Publications, Inc., 1960. 288 pp. \$1.55.)

Although intended primarily for use by physical scientists and engineers, this statistics manual merits attention from behavioral scientists because it presents techniques for analyzing distributions other than "normal." The discussion of the Binomial and Poisson distributions, and the chapter on tests of distributions as a whole will be of particular value. The text assumes a basic knowledge of statistics, and emphasis has been placed on the need for consulting with a statistician during the planning phase of an experiment, the inferences permissible from certain techniques, and the confidence limits which may be attached to an estimate. The examples are taken from ordnance development and are somewhat of a welcome change from those involving pig litters, crop yield, archery scores, and intelligence tests.

This edition has been constructed in such manner that rebinding with a cloth cover will result in a book with wearing qualities equal to most higher priced textbooks.

A combination of this text, Siegel's *Nonparametric Statistics*, and one such as Walker and Lev or Edwards, should provide the researcher in the behavioral sciences with material to handle any statistical problem which he might encounter.

WRP

BOOKS RECEIVED

Marksmanship for Young Shooters. (Washington, D. C.: A. A. H. P. E. R., 1960. 22 pp. Paper. \$1.00)
Shooting taught with the BB gun.

News and Comments

VA REPRESENTED AT WHITE HOUSE CONFERENCE

The Veterans Administration sent 20 representatives to the White House Conference on Aging, January 9-12, and an additional 16 VA staff members were chosen as Federal resource personnel to participate in work groups at the conference. All are from the VA's Central Office in Washington, D.C.

Representing the VA at the conference were Deputy Administrator Robert J. Lamphere; chief benefits director W. J. Driver, and the assistant administrator for personnel, E. R. Silberman.

Also Dr. Irvin J. Cohen, assistant chief medical director for professional services; Dr. Linus A. Zink, Assistant deputy medical director for operations; Dr. Robert I. McLaughry, director of medical education service; Dr. I. Rosen, assistant controller for statistics; T. O. Kraebel, director of vocational rehabilitation and education service; D. J. F. Casey, director of psychiatry and neurology service; Dr. Cecil Peck, chief consulting psychologist; Dr. Turner Camp, director of clinics, and Dr. Frank J. Schaffer, assistant director of physical medicine and rehabilitation service.

Others are the Rev. E. J. Kroencke of the chaplain service; J. M. Hansman and Dr. R. F. Martin of the policy and evaluation staff; Miss Ruth Adams of nursing service; Henry J. Gartland, director of the medical and general reference library staff; R. P. Bland of the office of the general counsel; Miss Jean Crooks of dietetic service; and F. R. Hood, director of information service.

RECREATION SEMINAR ON EMOTIONALLY DISTURBED TO BE OFFERED BY TEACHERS COLLEGE

Elizabeth Rosen, Ph.D. will offer a seminar on recreation for the emotionally disturbed at Teachers College, Columbia Univ. beginning February 13.

FIRST WOMAN COMPLETES TRAINING AT CHILLICOTHE



Jill Lopez, a senior in physical education at Ohio Univ., is the first woman to complete clinical training in corrective therapy at the V.A. hospital in Chillicothe. Shown with Miss Lopez are George Jurcisin, CT clinical training supervisor, Thomas Graf and Paul Hartsough, both clinical trainees from Ohio Univ., and Robert L. Davis, Chief, Corrective Therapy.

USE OF ANTI-COAGULANT DRUGS IN LONG TERM TREATMENT IS QUESTIONED

Advisability of the widespread medical practice of long-term treatment with anticoagulant drugs following strokes was strongly questioned by findings of a Veterans Administration study reported in Miami Beach, Fla., May 1. Dr. Robert N. Baker, a member of the executive committee for a nine-hospital VA group, said their findings to date give no indication that such use of anticoagulants has value in preventing further strokes or lowering mortality. Further, the study indicates that even with extensive precautions in use of the drugs, the medication probably increases the chance of hemorrhage in patients who have had strokes.

Dr. Baker said the research will be continued, to determine the value of anticoagulants for patients in whom contraction of a blood vessel of the brain causes brief paralysis.

The project is part of a major VA cooperative study of hardening of the arteries, heart attacks, and disease of the blood vessels of the brain, which has been underway for several years.

Dr. Baker, chief of neurology at the Los Angeles, Calif., VA center, reported on the section of the study concerning strokes, and in detail on the 189 stroke patients, to the International Conference on Vascular Disease of the Brain, held at Miami Beach's Eden Roc Hotel. He said that at the end of the first two years of the cooperative study, findings on these patients offer "no suggestion that anticoagulants improved the course of cerebral vascular disease."

The incidence of further strokes and the mortality are the same in the VA group receiving anticoagulants following strokes as in comparable VA stroke patients not receiving anticoagulants, Dr. Baker said.

The chairman of the study is Dr. Albert Heyman of the Durham, N. C., VA hospital. In addition to the Los Angeles VA center and the Durham VA hospital, the VA hospitals in Brooklyn and the Bronx, N.Y.; Boston, Mass.; Seattle, Wash.; Oakland, Calif.; Denver, Colo., and Houston, Texas, are participating in this research.

Normally, uncut meat contains from 25 to 50 percent fats by weight, according to Miss Elva Hiscock, research dietitian at the Los Angeles VA center and a member of the research team for the study. "Most people find a 'no fat' diet very monotonous. A diet in which animal and dairy fat and solid shortenings are replaced with liquid vegetable fats is acceptable," she said.

Miss Hiscock supervises the diets of nearly 2,100 elderly volunteers in the study at the center. There are about 4,000 other patients there.

The research team for the diet study, headed by Dr. Seymour Dayton, chief of a medical section of the Los Angeles VA hospital, and Dr. Morton Lee Pearce, chief of the cardiology section, is now planning the development of special hot-dogs, sausages, and "aged" cheeses containing only vegetable oils.

VA doctors hope to be able to determine whether substantial changes in fat-types in the diet, even at a comparatively late period in life, affect the incidence of heart attacks and strokes, and whether the long-term process of hardening of the arteries can be stopped or reversed.

Cooperating with the VA in the study are the National Heart Institute, the Los Angeles County Heart Association, the Soybean and Corn Products Industries, and research laboratories of a large Los Angeles dairy.

STUDY SURGERY FOR TREMORS IN PARKINSONIANS

A study of newer surgical methods for alleviating tremor in Parkinson's disease (the shaking palsy) has been initiated by the Veterans Administration. A seven-hospital project will evaluate use of the brain surgery, known as pallidectomy, for selected patients. It also will study applications of newer vascular surgery techniques that show some promise of being helpful against Parkinson's disease. Chairman of the study is Dr. Blaine Nashold of the Durham, N.C., VA hospital.

Dr. Lyndon E. Lee, Jr., coordinator of the project for the VA in Washington, D.C., said pallidectomy is expected to be acceptable for only a small number of the some 2,000 veterans treated for Parkinson's disease in the agency's hospitals each year. It involves destruction of a lower part of the brain by chemicals by electrocautery, ultra-sound, or other techniques, he explained.

Since there is hope that better surgery for Parkinson's disease may be developed within a few years, doctors hesitate to perform the irreversible brain destruction except when it is imperative for relief of the patient's distress, Dr. Lee said. Laboratory studies of newer vascular surgery techniques will be carried on at some other participating hospitals by researchers in brain physiology, chemistry and allied fields.

The VA physicians are coordinating closely with Canadian physicians doing similar work on surgery for Parkinson's disease. Two Canadian physicians, Dr. Claude Bertrand of Notre Dame Hospital, Montreal, and Dr. Harold Elliott of Montreal General Hospital are taking part in the VA study.

In addition to the Durham, N.C., hospital, the locations of the other participating VA hospitals, with the doctor in charge of the study at each, are: Boston, Dr. John Drew; Cincinnati, Dr. George Nugent; Coral Gables, Dr. August Buermann; Iowa City, Dr. Olan Hyndman; Long Beach, Dr. R. W. Porter; and Richmond, Dr. Jack L. Ulmer.

Consultants for the study are Dr. Barnes Woodhall of Duke University and Dr. Francis Forster of the University of Wisconsin.

WINS PERFORMANCE AWARD



Wilburn Curnutt (right), corrective therapist, V.A.H., Waco, Texas, receives Sustained Performance Award in recognition of his "industry, efficiency and willingness to help the disabled." Presenting the award is James A. Moore, Coordinator, PM&RS, as Julian Vogel, Chief, Corrective Therapy, looks on.

VA HAS NEW PROGRAM FOR NSC VETERANS

Pre-hospital and post-hospital medical service now is authorized for nonservice-connected veterans where hospital stay can be shortened by these procedures, the Veterans Administration has advised. The VA said this service will be furnished by its own hospitals. The new Public Law 86-639 does not extend VA outpatient care to nonservice-connected veterans. It applies only to veterans who are scheduled for admission to, or who are patients in, VA hospitals.

By performing certain pre-hospital and post-hospital medical procedures on an outpatient basis, as is done by private hospitals, the VA hopes to shorten the patient's stay in a hospital bed. Thus better use of existing VA hospital beds is expected. Care that may be furnished in preparation for hospitalization, without actually placing the veteran in a hospital bed, will include laboratory and x-ray examinations. The new program will be known as pre-hospital and post-hospital care.

Service-connected veterans scheduled for admission to, or patients in, VA hospitals will be included in the new program as medically indicated. The bulk of VA outpatient care for the service-connected will continue to be furnished through the VA outpatient clinics and hometown medical program.

Patients authorized pre-hospital or post-hospital care for service-connected conditions will be provided necessary travel to and from VA hospitals at Government expense. For psychiatric patients, travel at Government expense, as required, may be provided to depart from, and return to, the hospital for necessary followup care.

Other patients authorized pre-hospital or post-hospital care for nonservice-connected conditions, including those with additional conditions that are service-connected, will be furnished necessary travel at Government expense provided they indicate that transportation is required and execute an affidavit that they are unable to defray the cost of travel. Dental prostheses, wheelchairs, artificial limbs, trusses, and similar appliances, clothing, and other supplies may not be furnished as part of the pre-hospital care.

The duration of post-hospital followup will be limited to that which is consistent with good medical practice and necessary to conclude treatment of the condition for which the veteran was hospitalized.

Necessary medications and supplies for treatment of the conditions for which patients were hospitalized may be furnished by the VA as part of the post-hospital care as appropriate.

SYNTHETIC SKIN DESCRIBED

Encouraging results with a synthetic skin have been reported from the Buffalo, N.Y., Veterans Administration hospital. Aim of the research is to save the lives of persons who suffer massive burns, said Dr. William M. Chardack, the VA surgeon who heads the project.

The material used is a combination of polyvinyl sponge and silicone rubber, which is rigid when dry but becomes soft, pliable and elastic when moist.

These synthetic skin grafts used in animals, have been maintained for periods up to 104 days. As the graft "takes," the surgical sponge is premeated by tissue, and firm adherence can be obtained within a few days. The skin substitute can be made waterproof by application of a coating of silicone rubber. When the area of skin loss from burns on a patient is greater than the area of his healthy skin available to furnish skin grafts, satisfactory treatment often is impossible, Dr. Chardack said.

Problems resulting from burns, once survival of immediate shock is insured, are from loss of body tissues and certain essential chemicals and from infection in the area of the burn wound. Covering these burns with any impervious material tends to aid the patient by preventing fluid loss and infection.

For these patients, Dr. Chardack hopes the inert synthetic temporary skin will prove life-saving. Skin grafts from other persons that have been tried as skin replacements for such patients in the past have in general failed to provide more than a very temporary and precarious covering.

Dr. Chardack is chief of surgery at the Buffalo VA hospital and associate professor of surgery at the University of Buffalo School of Medicine. His co-workers in the research are Dr. George Fazekas, who is the Buffalo VA hospital's chief of laboratory service, and two of the hospital's residents in surgery, Dr. Carl E. Day and Dr. Dewane A. Brueske.

They emphasize that the skin prosthesis is not permanent, but they believe the material may provide a satisfactory temporary cover for tissue of burn victims that will enable these patients to improve sufficiently for staged coverage of the burned areas by successive small grafts from their own remaining uninvolved skin.

The doctors are continuing their research to learn more about ultimate replacement of the grafts by skin and problems of extending use of the synthetic grafts to coverage of burns and other injured areas where availability of this temporary artificial skin might be desirable.

RESEARCHERS WIN MIDDLETON AWARD

The Veterans Administration's first William S. Middleton Medical Research Award has been presented to Solomon A. Berson, M.D., and Rosalyn S. Yalow, Ph.D., of the Bronx, N.Y., VA hospital. The award honors the VA Chief Medical Director, Dr. Middleton, and was established by a group of his friends on the occasion of his birthday, January 7, 1960. A bronze plaque, it will be retained at the Bronx VA hospital until the next award is made in 1961.

Dr. Berson is the Bronx VA hospital's chief of radioisotope service and Dr. Yalow is associate chief of the service. Their findings in the study of insulin during the past year have opened vast new areas of research on diabetes and have had international impact in the medical field.

Employing radioisotopically labeled insulin, Dr. Berson and Dr. Yalow have found that all diabetic patients treated with insulin soon develop antibodies directed against insulin and capable of modifying the effects of insulin.

They have also pioneered the application of radioisotope techniques to the study of thyroid function and blood volume in man and have made contributions on the metabolism of serum proteins and the effects of irradiation on proteins and amino acids.

Workers from abroad as well as from Canada and the United States have come to Drs. Yalow and Berson for training in the techniques and methods for the immunoassay of plasma insulin.

HISTAMINE IMBALANCE CAN CAUSE PSYCHIATRIC SYMPTOMS

How imbalance of histamine, a natural body chemical overproduced during allergy attacks, can block the brain's link with reality and cause mental disturbance has been reported by a Veterans Administration research worker. Dr. Amedeo S. Marrazzi, director of the VA's research laboratories in neuropsychiatry at the Leech Farm Road VA Hospital in Pittsburgh, said studies in animals, by "tapping in" on the tiny currents flowing through the brain as it acts as a switchboard, show how histamine, LSD-25, (and also large doses of tranquilizers) each can produce this effect by acting on the brain's reference area, blocking the ability to balance new impressions with past experience and thus check with reality.

LSD-25 is well known to scientists for its ability to produce temporary symptoms similar to those seen in the mentally ill.

Dr. Marrazzi believes further research is needed to determine whether some mental illness may be caused by liberation of histamine in the body due to an allergic process.

His findings are evidence that natural chemicals similar to histamine and LSD-25 act in the brain in the same fashion as do these and can be studied in the same way.

Dr. Marrazzi found that animals receiving moderate doses of tranquilizers before being given LSD-25 were protected from the mental disturbance that the second drug causes. But tranquilizers alone in overdosage had the same effect of blocking the memory as does LSD-25. It, therefore, seems to Dr. Marrazzi that the protection afforded by tranquilizers results from the fact that they can get in the way of LSD-25, to which they are similar but very, very much weaker. He pointed out that a large group of tranquilizers (the phenothiazines) are closely related chemically to the anti-histamine drugs used in treating allergies.

Tests made by Dr. Marrazzi show that animals under the influence of the insanity-producing LSD-25 are hindered in making decisions until the drug wears off.

At present, Dr. Marrazzi is trying to devise a "clinical yardstick," based on the measured distortions of preception produced by tiny amounts of LSD-25, for testing any individual and showing whether he is mentally healthy, mentally sick, or on the borderline—just mentally abnormal enough to need preventive measures and observation.

He hopes the yardstick also will show whether psychotherapy is benefiting the individual patient and how effective new drugs are against mental disturbance. So far, results from his battery of tests with animals jibe with what doctors see in mental patients. He has begun to use some of the tests for human volunteers, including college students and patients.

ANNOUNCE FINDINGS OF VA RESEARCH ON ANTIHYPERTENSIVE DRUGS

Research findings concerning choice of treatment for high blood pressure for patients throughout the nation have been announced by the Veterans Administration. The findings are from the nation's first large-scale controlled test of newer drugs in general use against the disease—a project underway in eight VA hospitals for nearly two years.

Dr. Edward D. Preis of the Washington, D.C., VA hospital, chairman of the study, said the information gained on the safety and relative effectiveness of the compounds should enable doctors to better choose, from among the available antihypertensive drugs, treatment most useful for the individual patient.

For patients with mild high blood pressure, a combination of two compounds, reserpine and hydralazine, was found more effective than reserpine alone. Reserpine alone was found to have little effectiveness against the condition.

For patients with moderately severe high blood pressure, the reserpine-hydralazine combination was considerably more effective than reserpine alone and was better tolerated than and about as effective as reserpine plus ganglion-blocking drugs.

Combinations of reserpine with each of three ganglion-blocking drugs—mecamylamine, chlorisondamine, and pentolinium tartrate—were tested against both moderately sev-

ere high blood pressure and severe hypertension.

Each of the three blocking drugs, with reserpine, produced significant reductions in blood pressure. The three were about equal in effectiveness but varied slightly in frequency of undesirable reactions produced.

Chlorisondamine treatment was associated with visual disturbances in patients, and mecamylamine produced slightly more dryness of the mouth and bladder difficulty than did chlorisondamine or pentolinium tartrate.

Of the 101 patients receiving reserpine plus hydralazine, the treatment was discontinued in nine because of development of drug reactions such as headache, stomach upset, or nervousness.

The cooperative study, involving some 320 patients with high blood pressure, was made at the VA hospitals in Brooklyn, N.Y.; Chicago (West Side VA Hospital); Iowa City; Oklahoma City; Richmond, Va.; San Juan, P.R.; Seattle, Wash., and Washington, D.C.

Findings of the research are published in a current issue of the American Medical Association's *Archives of Internal Medicine*.

The VA cooperative study of newer drugs against high blood pressure will be a continuing project. Various compounds, including chlorothiazide, are under study in this research project at present.

REPORT HIGHER TURNOVER OF PATIENTS IN MENTAL HOSPITALS

A steady rise in the turnover rate of psychiatric patients in Veterans Administration hospitals has been reported by the agency. The yearly rate available for new patients has increased from 66 percent in 1955 to 78 percent in 1960. As a result, the VA during the past year was able to admit more than 41,000 psychiatric patients to its hospitals. The agency now operates 58,668 beds for the care and treatment of these patients.

Dr. J. J. Blasko, assistant director of the VA psychiatry and neurology service in Washington, D.C., said the increase results from extension of more intensive treatment to a larger number of the agency's mentally and emotionally disturbed patients.

He said the newer drug therapies in psychiatry have made patients more accessible to treatment in recent years, and findings of the VA's large-scale cooperative studies of these drugs have played an important part in developing the therapies.

"The relief of human suffering implicit in the return of this number of psychiatric patients to their families and communities is most impressive and calls to mind what has happened in the field of tuberculosis during the past 15 years," Dr. Blasko said.

"The VA and the Armed Forces in 1946 began a continuing series of large-scale cooperative studies of newer drugs for TB which have produced findings on the usefulness of the drugs for the entire medical profession. Today, thanks to chemotherapy, hospital stay of tuberculosis patients has been so shortened that the VA has converted eight of its TB hospitals to general medical and surgical use. In 1955, the VA began its large-scale studies of newer drugs in mental illness, patterned after the tuberculosis drug studies. Increasing use has been made of programs under which the patients live outside the hospital, such as trial visit and foster home. Each year since 1955 more psychiatric patients have been able to leave the VA hospitals."

Dr. Blasko said the number of admissions of psychiatric patients to VA hospitals has increased from 37,169 in 1957 to 41,452 for 1960. He said VA general medical and surgical hospitals now admit more psychiatric patients than do the VA mental hospitals.

Of the 41,452 admissions of VA psychiatric patients in 1960, 22,357 were to general medical and surgical hospitals, 18,989 were to psychiatric hospitals, and 106 were to TB hospitals.

The general medical and surgical hospitals usually treat patients who have less severe mental or emotional disturbance and a shorter hospital stay, while the mental hospitals take the more severely ill veterans who stay longer, Dr. Blasko said.

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